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	Route to	See page
1		
2		
3		
4		
5		
6		

Contractors and Engineers Monthly

Vol. 44, No. 2 · FEBRUARY, 1947 · $3 a Year, 25 Cents a Copy

Covering the Field

• Building New Airport

Three articles on page 2 cover airport grading in mire; the custom-made portable rock plant used to produce runway base course; and the concrete paving set-up.

• Foundation Construction

Some 1,637 steel piles were driven to bedrock and topped by a reinforced-concrete mat to support a 26-story skyscraper, as told on page 6.

• New Concrete Highway

Bad curves and a pair of mules feature a contract, reported on page 11, to realign a highway and pave it with concrete.

• Bituminous Paving

Preliminary to laying a bituminous-macadam pavement (page 17) was some heavy grading and drainage-pipe installation.

• Contractor's Equipment Shop

Heavy paving and grading equipment is overhauled during winter months at the contractor's shop described on page 22. Standardizing on parts has helped.

• Highway Grading

Light sand which would not permit truck and shovel work called for unorthodox methods on a 6½-mile contract. See page 25.

Two contractors blast a new highway through the Big Horn Mountains and top it with a road-mixed armor coat on a select crusher-run base. Turn to page 75.

• County Road Work

Asphalt plants, county-owned-and-operated, have helped solve road-restoration problems. See page 29.

• Roadside Development

Seeding and mulching methods for ground cover are detailed on page 34.

A procedure is outlined on page 51 for saving right-of-way trees during grading.

• Snow Removal

Contractors supplement state forces on snow removal in this state where snow falls during ten months. See page 41.

• Road-Base Construction

Laying a select crushed-rock base is described on page 47, along with application of prime and seal asphalt coats.

• New Dual Overpass

Read on page 53 about a dual overpass to span a river and railroad; a dramatic earth-moving scheme; and safety measures. See pictures on pages 44 and 45.

• A 486-Mile Expressway

Page 58 reviews design details, route, and financing of the New York Thruway scheduled for completion in 1951.

• Soil-Conservation Contracts

Several 1946 earth-moving contracts for soil-conservation drainage ditches are covered on page 63.

• Highway Maintenance

State forces replaced some cracked concrete slabs and raised others by Mud-Jacking, as reported on page 69.

(You will find "In This Issue" on page 4)

C. & E. M. Photo

Aggregate production is an important phase of highway work, for base course, for low-cost roads, and for concrete and bituminous pavements. This crushing plant turned out 60,000 tons for a sealed-crushed-rock road in Missouri. See page 47.

Road-Building Is A National "Must"

One of the outstanding express-highway projects in the country is the 486-mile New York State Thruway. Here Governor Thomas E. Dewey breaks ground for this $202,000,000 project, to be financed largely by state funds. The first five contracts began in 1946. See page 58.

Our highway program is more than economic pump-priming or an unemployment-relief measure. New roads, reconstruction and relocation of old roads, new bridges and grade separations are essential, to maintain and improve our vital transportation facilities.

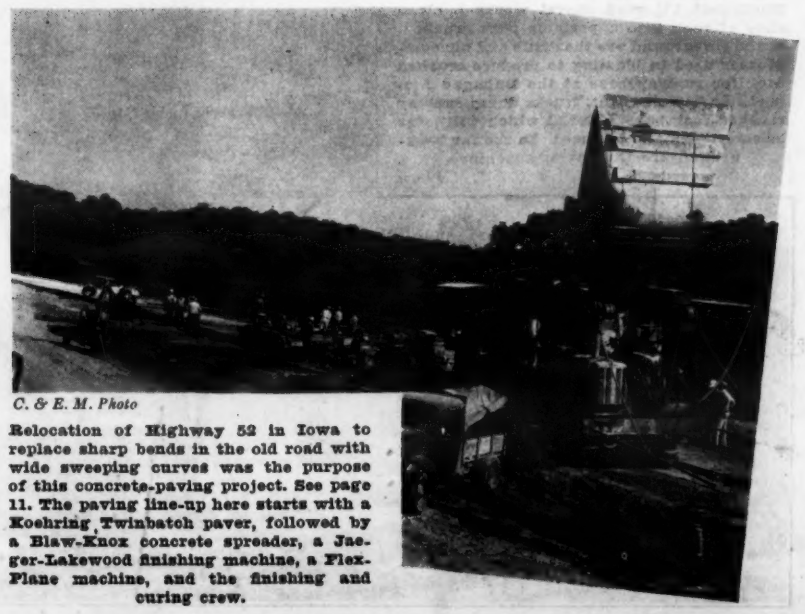
Meeting at the Palmer House in Chicago February 17-20, the American Road Builders' Association will have as its theme "Everyone has an economic and human stake in a road-United States". Many road problems will be discussed, with emphasis on ways and means to insure a consistent integrated forward-looking highway program.

C. & E. M. Photo

The past year brought a large number of highway grading jobs, as work started on the reconstruction and relocation of old and obsolete roads. Typical of many such projects is the tractor-scraper dirt-moving outfit—here a 14-yard Carryall and Caterpillar D8 tractor—on a 323,000-yard job in Wisconsin. See page 25.

C. & E. M. Photo

One of the most urgent needs in the highway program is the elimination of grade crossings. High on Utah's priority list of post-war projects was a dual overpass to carry U. S. 91 over the Weber River and the Northern Pacific railroad tracks near Ogden. Here a Northwest crane and pile driver place wood piles in a bridge-pier foundation. See page 53.



C. & E. M. Photo

Relocation of Highway 52 in Iowa to replace sharp bends in the old road with wide sweeping curves was the purpose of this concrete-paving project. See page 11. The paving line-up here starts with a Koehring Twinbatch paver, followed by a Blaw-Knox concrete spreader, a Jaeger-Lakewood finishing machine, a Flex-Plane machine, and the finishing and curing crew.

Grading, Base Course, Paving at New Airport

Drying of Water-Soaked Soil Plagues Excavating Contractor on Midwest Air Terminal

By RAYMOND P. DAY,
Western Editor

✦ THE city of Dubuque, Iowa, is now the proud owner of a new municipal airport, the equal of any Class A terminal in any American city the size of Dubuque. The new airport was built by contract under the direction of the Kansas City Regional Office of the Civil Aeronautics Administration. Approximately 4,000,000 cubic yards of grading have been moved in two years by McVaugh-Haynes Co., Inc., of Detroit.

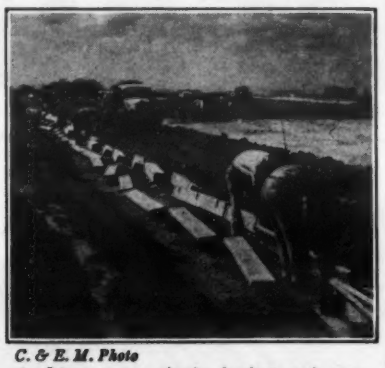
Soft Iowa mud has dogged the efforts of McVaugh-Haynes ever since the work began. The airport had to be located about 7 miles southwest of Dubuque because all the territory nearer the city was too rough. But even so, all the grading has been a problem of the first magnitude.

Grading consisted of leveling low hills and filling gullies and low places. At the south end of the north-south 4,900-foot runway, the fill is 55 feet high. Most of the earth in this fill was dried out from 32 to 19 per cent moisture while it lay in place in cuts. Many a summer day when air temperature was high but so was the humidity, soil would resist all efforts so far as processing was concerned. It is a rather impressive fact that on an average day, when McVaugh-Haynes Co. was moving 20,000 cubic yards of material to the fill, it was evaporating 500,000 gallons of water, or enough to furnish Dubuque its water supply for that day.

Excavation Methods

The work was done with a fleet of mechanized earth-moving equipment. Caterpillar D8 tractors numbered 18, and with these the contractor used 13 LeTourneau Carryalls, mostly Model W's, rated at 18-yard heaped capacity. Also, 10 LeTourneau Super C Tournapulls were moved in. And 3 heavy-duty Roman disks, including a Breaker, a Versatile, and a lighter machine, were used to good advantage with D7 power. Five sheepsfoot rollers were used; these included a new Gebhard, used on subgrade, which delivers 360 pounds of pressure per square inch at the point of impact. Three Caterpillar No. 12 mo-

(Continued on page 15)



C. & E. M. Photo
A form crew starts laying out new Heltzel steel forms for runway on the Dubuque Municipal Airport job.

Custom-Made Rock Plant Has Portable Features Especially Suited to CAA Airport Job

✦ THE job of crushing lime and flint rock for a 7-inch pervious blanket under 10,500 linear feet of 150-foot airport runway at Dubuque, Iowa, was done by Wonn & Bailey of Cobb, Wis. Mr. Wonn "upped" crusher output to a steady 100 cubic yards per hour with a unique plant which goes to the source of its rock supply.

The new portable plant which Mr. Wonn designed was truck-mounted on eighteen rubber tires. It was custom-made to his design by Wisconsin Foundry & Machine Co. of Madison, Wis. This crushing plant embodies such features as an 18 x 38-inch primary jaw crusher and a twin set of 30-inch rolls, one set at 1-inch clearance, and the other set to touch when empty.

Wonn used his crushing plant at the Dubuque Airport in a flint and lime-rock deposit at the west side of the new

(Concluded on page 74)

Schedule for Paving of Concrete Runways Set Up On Basis of 2,000 Feet Of 25-Foot Slab Per Day

✦ THE main paving item on the new Dubuque Municipal Airport consisted of 9-inch plain concrete in taxiways, and 8-inch plain concrete in the balance of runways; there is a 500-foot apron at each end of each runway. Total paving length in the 150-foot runways was 10,500 linear feet.

At the time the airport was visited for CONTRACTORS AND ENGINEERS MONTHLY, the 7-inch crushed-stone blanket was being processed and graded by S. J. Groves & Sons Co., contractor of Minneapolis, Minn. That firm was awarded the CAA contract for rock-blanket subbase and concrete paving. However, the mixing and placing of concrete was sublet to Woodrich & Son of Minneapolis, and preparations were being rushed to get into production as soon as possible to beat the November 1 time limit, and also, incidentally, the autumn Iowa rain. Jim Strain was Paving Superintendent on the job.

Forms and Fine-Grading

Approximately 5,000 linear feet of Blaw-Knox steel forms were available for the 9-inch concrete, and another 5,000 feet of new Heltzel steel forms had been delivered for 8 or 9-inch concrete. These forms were set at least 800 feet ahead of the paver, and lined up on pouring strips 25 feet wide. The new forms weighed 240 pounds each, and were hauled and handled by a Scoopmobile.

Since the forms were set on a blanket of crushed rock, no form trench had to be dug. The base of the forms was mechanically tamped, however, by two Cleveland form tampers.

Fine-grading between forms took place as the final leveling course of rock dust came in. This was done by an R-B Finegrader. If excessive amounts of rock dust were left after the final dumping, a Caterpillar No. 11 motor grader was on hand to move it ahead and a Traxcavator to take it out.

The grade was built to neat lines and not left high, as is sometimes done. The final compaction was secured by sheepsfoot, pneumatic-tire Wobble Wheel, and smooth rollers. A Galion 10-ton 3-wheel machine was used for this latter process. Final sprinkling of the crushed rock was done just ahead of the placing of the concrete.

The drawings called for longitudinal construction keyed joints, formed and bolted to the sides of the steel forms. The contractor secured some oak lumber, well seasoned, in Dubuque. This construction key was made 3½ x 2 x 1½ inches deep.

Contraction joints were placed on 20-foot centers in the slab, with expansion joints every 200 feet. The expansion joints have ¾-inch round steel dowel bars capped at one end and spaced on 12-inch centers. This joint is also filled with ¾-inch premoulded asphaltic material, which arrived on the job in 8 and 9-inch-wide strips 12½ feet long. Two of these pieces were required to reach across the pouring lane.

All dowel bars were held in place while the concrete was poured by cradling them in a steel basket, or template. Contraction-joint dowel bars, which were put in on 30-inch centers, received a coat of cup grease but no cap.

Batch Plant and Aggregate

Sand and bulk cement had to come to Dubuque by rail, there be unloaded, and trucked out to the airport 7 miles away. The day the job was visited, a new 3-compartment Butler batching plant had arrived and was being set up by a Bucyrus-Erie 43-B crane. Later, this machine kept the 20-yard bins filled with two sizes of aggregate and sand from the stockpiles.

Approximately twenty 5-yard dump trucks were required to haul crushed rock from two locations near the airport site. This material was dumped in piles and loaded by the 43-B Bucyrus-Erie clamshell to the bins, as needed.

Crushed rock met the following gradation requirements:

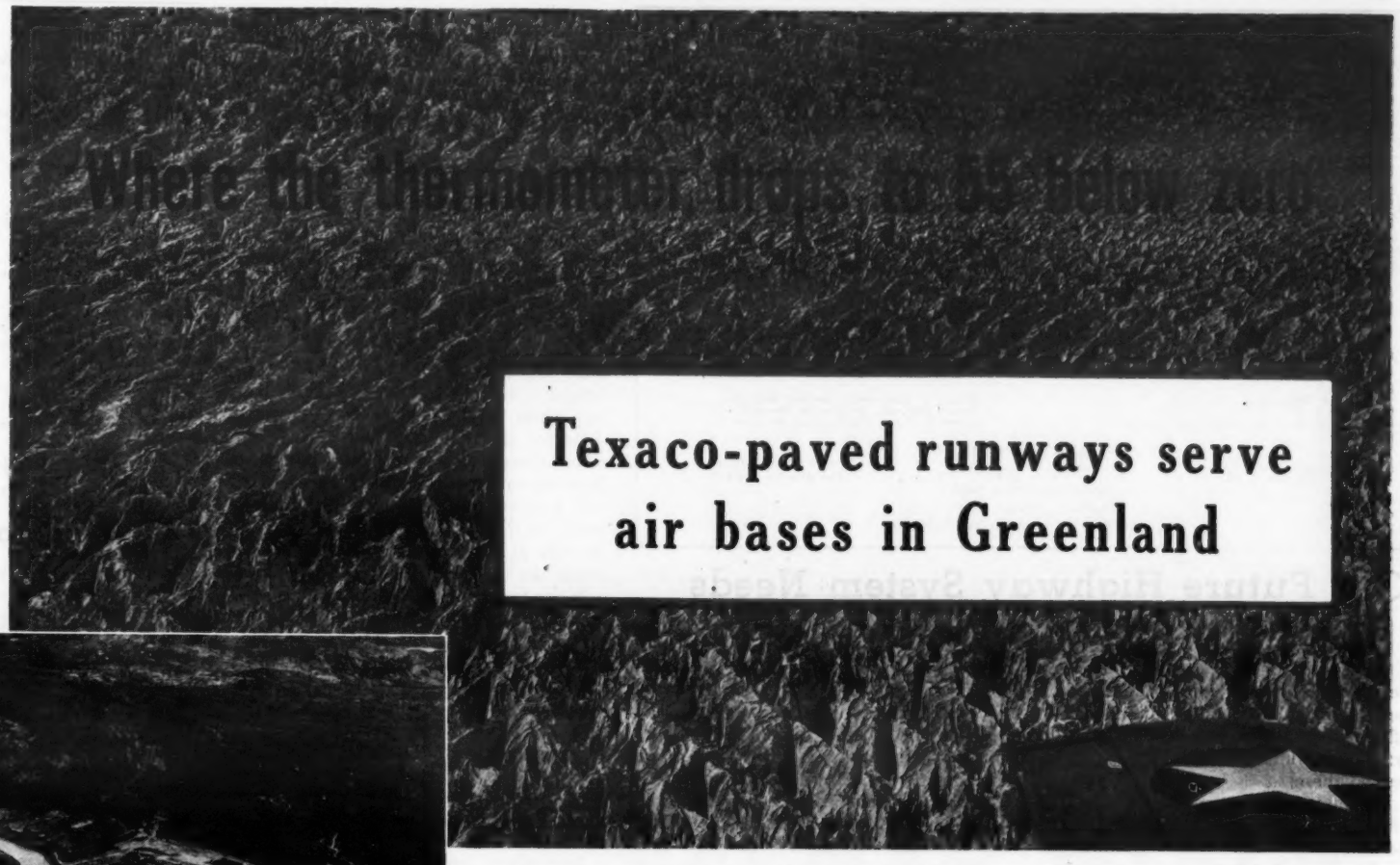
(Continued on page 85)

At right, a test model of LaPlant-Choate's new rubber-tired tractor-scraper rig loads, with a Caterpillar D8 pushing, on the Dubuque Airport grading job. At left, below, a Northwest 1½-yard shovel works a clean slice of rock into a portable rock crusher; in the foreground are the drills and air compressor used in blasting to produce crushed rock for runway base at the Dubuque Airport. At bottom right, trucks dump runway crushed-rock base material which will later be compacted and trimmed. In the far background are the paving machines.

C. & E. M. Photos

U. S. Army Corps of Engineers photographs

Texaco-paved runways serve air bases in Greenland



Air view of an active glacier in the vicinity of one of the Greenland air bases.

One of two air fields constructed by Army Engineers in Greenland as refueling points for Europe-bound planes.

This airport runway in Greenland has a 3-inch Texaco Asphalt surface of the mixed-in-place type.

Daylight 24 hours a day in summer permitted construction operations around the clock.

Army planes squatting on an apron of a Greenland airport, while awaiting their orders.

To provide refueling points for Europe-bound transport planes and bombers during the war, U. S. Army Engineers were handed the difficult assignment of constructing two air bases in Greenland.

The airports are located in two valleys, which contain an abundant supply of gravel deposited by glaciers. To pave most of the runway area, the Engineers used this gravel for aggregate and Texaco Medium-curing or Rapid-curing Cutback Asphalt as the binding agent.

Two of the three runways, including one 55 miles above the Arctic Circle, received a 3-inch mixed-in-place surface, using Texaco MC-2 Cutback Asphalt and screened gravel. Penetration Macadam construction also was used, in which Texaco RC-2 Cutback Asphalt was applied to crushed gravel.

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William H. Quirk, Eastern Editor · Raymond P. Day, Western Editor · Melvin Dean, New Products Editor · Olive E. Potter, Managing Editor

Edgar J. Buttenheim, President
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Our Future Highway System Needs Public Support; Let's Work to Get It

America's highway system is in danger. State highway department engineers and Public Roads Administration officials face the fact today that modern traffic has finally caught up with and passed them.

We admit the staggering magnitude of technical problems they face. But we believe these capable of solution if the load is shared with the public who pays the bill. Only through frank acknowledgement that human mistakes have been made and are likely to continue can the people be informed and made to care about the crying need for a road-building program. As it stands now, the public neither knows nor cares, and highway builders the country over will face the razor-sharp axe of economy as the 80th Congress convenes.

If the poised axe falls, then by the time an awareness of the problem comes to the public and the investigating committees, it may be too late to pull currently salvageable roads out of the mud.

Recently the American Association of State Highway Officials met in Los Angeles. Almost every highway engineer in attendance said his roads were the worst in the nation, or admitted candidly that they were not up to the standards he would have them. Equipment shortages were discussed, and lack of materials and skilled personnel. Resolutions were adopted to help solve those problems. It was a commendable beginning.

Not openly mentioned was the fact that many state highway departments are shot through and through with vicious political control. Neither was it admitted that many engineers are still designing horse-and-buggy roads for the atomic age. The fact that gasoline-tax revenue collected by the Federal government—and some states—is not always expended on highways was discussed, but not very loudly in front of the press.

We ourselves can point out how competent engineers and technicians in some state highway departments are subject to the changing whims of politicians who control them. We can vouch that at least one state highway department has been barred from buying good road equipment by the controller of its finance department, a gentleman whose knowledge of road problems amounts to precisely nothing.

We can say the situation is so critical in another great state that politicians in its legislature now propose to apportion highway funds *on the basis of individual projects*, making of the situation a vast pork barrel instead of the intelligently integrated scheme it should be. But there is no point in continuing on this track ad nauseam, for most of our readers already are familiar with these problems.

Rather it is for us to urge a sharing of problems and information with the fare-paying public. We believe that this is a big part of the overall solution in a democracy. For out of such a program may come an overthrow of the politicians, a demand for better roads, and the money to pay for them.

We believe that each state highway department should have a full-time public-relations man, paid on a salary scale commensurate with the chief engineer of construction. His staff should be so limited that all hands would have to work efficiently eight hours a day. One good public-relations man alone should be able to handle the story of highways in the smaller states; one man with not more than three assistants could do the job in Texas or California.

The sole duty of this man would be to tell the public, in simple terms, the uncolored story of the state highway department and its activities. His mediums would be, of course, local newspapers, magazines, and radio. He could do as much for his state highway department in a few months as a member of the commission.

Does it sound so difficult? Does not the public have the right to know the facts?

Isn't it true that traffic loads are getting heavier? Why not tell the people about it and explain that the solution calls for more expensive roads than in the past? Why not admit the sheer stupidity of buying right-of-way for only four lanes of traffic when that many lanes are needed *now*?

When a job is let, why not give the local newspapers a release explaining simply that the sand being hauled from Joe Doakes' pit is going in underneath the slab to help drainage, and that this will make the riding surface stay smoother longer? What is so technical or obfuscated about that? Most of the difficulties in "letting the people know" can be resolved by the application of just such simple words and horse sense.

Why not explain that strong fills are a little more costly to build, but a road with one under its slab won't be obsolete in a few years? Why not tell how important good drainage is, but that it calls for more money when conscientious designers put it in the plans? Such an unfolding of mysterious secrets will go a long way towards the achievement of the ultimate highway system, though at the risk of stripping away many an engineer's mantle of glamor.

Make no mistake, the public will read those stories. If given the facts, the people will stand hitched to higher taxes for highways, just as they subscribed enthusiastically to the purchase of war bonds in the recent military jousting with a batch of dictators.

It is squarely up to the highway engineers to see that the people know and care. We believe it is as much their job to inform the public as it is to design and build the roads.

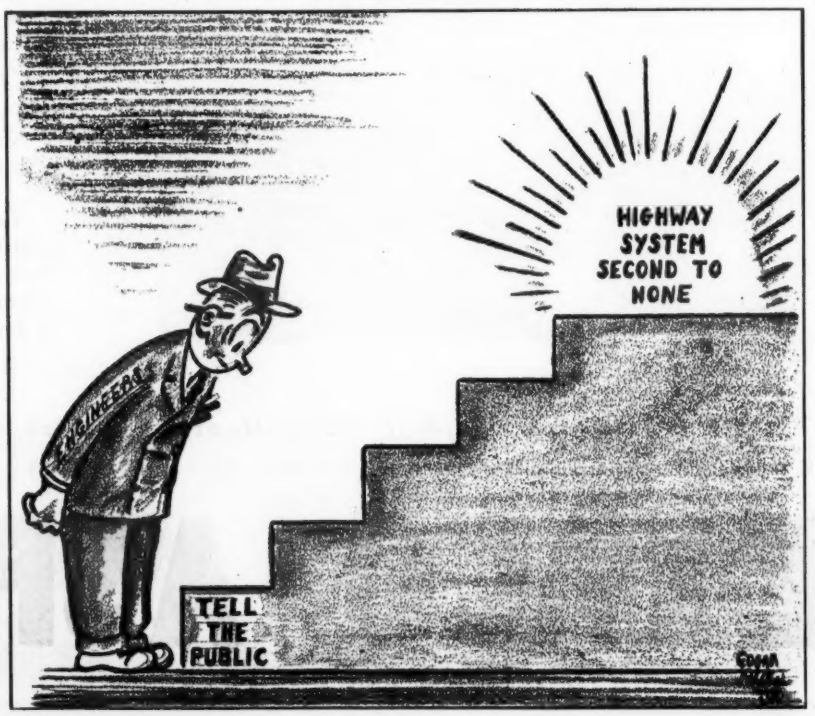
And their immediate job is much more than prosaic engineering. It includes a thorough study of all ramifications of the highway field, so that congressional leaders can be presented in unassailable terms with the truthful case of highway inadequacies.

It includes putting their departments in order; it may include admitting incompetence, perhaps, but pointing out likewise the grand record of millions of dollars worth of right-of-way acquisition by the PRA without a breath of scandal. It is a fascinating, newsworthy story these engineers have to tell the public.

Only by telling it can the engineers help themselves to realize a highway system second to none, a vast network of reality bounded only by the dreams and imagination of builders for the future.

The American Red Cross will launch its 1947 fund campaign on March 1. In peace as well as in war, the Red Cross stands ready to serve suffering humanity all over the world. It needs and deserves your generous support.

THE FIRST STEP!



In This Issue

Aggregate Production 2
Airports 2
Bituminous Paving 17, 29, 47
Concrete Construction 2, 11, 53
Convention Calendar 68
Convention Report 38
County Road Work 29
Editorial 4
Equipment Shops 22
Foundation Construction 6
Grade Separation 44, 45, 53
Grading 2, 17, 25, 53, 75
Highway Maintenance 69
Legal Decisions 83, 84
New York Thruway 58
Road-Base Construction 47
Roadside Development 34, 51
Safety 74
Snow Removal 41
Soil Conservation 63

AED Investigates Surplus-Property Disposal Situation

As the result of a nation-wide survey carried out by the Associated Equipment Distributors, a special two-day meeting of its Surplus Property Committee was held in Washington, D. C., in December. Ed P. Phillips, Phillips Machinery Co., Richmond, Va., was Chairman; William A. Danner, Parker Danner Co., Hyde Park, Mass., Co-Chairman; and Frank G. Knight, of the AED executive office, Committee Secretary.

The AED feels the surplus-property disposal situation is of such seriousness in its effects on the economic stability of American business that it decided to sponsor a surplus seminar of all national trade associations in Washington, D. C., in January or early February. At that time, it was hoped to put specific evidence of the failure of the Surplus Property Act of 1944 to function as it was planned into the hands of the officials in Washington who are directly responsible or who can get results.

Throughout the month of December, the Association carried out a "See Your Congressman" campaign, urging members to bring to the attention of their congressmen the experiences they have had with present surplus legislation. Also being pushed is the establishment of an investigating committee in both the House and the Senate to launch a continuous investigation of all phases of the surplus situation, both domestic and foreign.

In response to a call from WAA for qualified businessmen to serve as consultants on a top government surplus advisory board, the AED recommended several leaders in the industry who have the experience and background which will be of help in dealing with surplus problems.

Although WAA has reported that the surplus disposal job will be completed by June, 1947, the AED Committee feels there are several years ahead in which there will be a surplus-property disposal problem. The job of disposal is only about one-third done, with construction equipment amounting to millions yet to be moved. And when production begins meeting consumer needs, surplus equipment still going into circulation will cause dislocation of markets and may prove disastrous to the industry, according to AED spokesmen.

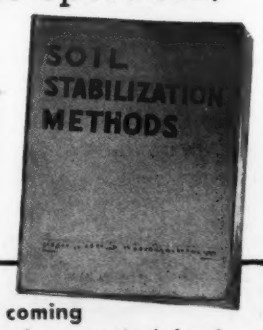
Some of the major faults with the methods of disposal were presented before the Committee. Among these is the abusive use of priorities and preference ratings. It is also felt that the veteran-housing freeze on construction equipment is an unjust imposition because of the fact that very little heavy equipment is used in housing construction.

Another point brought out before the Committee is the fact that notices of sales usually do not arrive in the hands of possible buyers in time for them to participate. The AED Executive Office is working out a speedy way of notifying its members of coming sales in time to be of use to them.

SHOULDER CONSTRUCTION AND SHOULDER MAINTENANCE COSTS

Radically Slashed with the SEAMAN MIXER

Shoulder stabilization is highly profitable in terms of lower maintenance costs and in greater traffic safety. With the SEAMAN MIXER, the initial stabilization costs can generally be cut as much as 40% in comparison to former methods, — for in most cases, — the aggregate already present in existing shoulders is entirely suitable for stabilization with oil, cement or other binders without trenching out or bringing in a single yard of borrowed material . . . For example,— in an eastern state, the Highway Department formerly kept 40 motor patrols busy on shoulder maintenance alone. Following every severe rain, scores of truckloads of gravel were required to replenish material which had washed away and what's more, drains and catch basins were plugged in the process . . . Shoulder stabilization with SEAMAN MIXERS proved to be the answer. The SEAMANS loosened the in-place aggregate to the required depth and in the same operation, started the mix . . . Total cost of scarifying, shaping and mixing was 5 cents per yard. So for similar low-cost shoulder stabilization,—do it with a SEAMAN.



Shoulder stabilization will prevent slab deterioration, traffic hazards and erosion such as occurred here.

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Requests keep right on coming in for this handy, practical book, "Soil Stabilization Methods" — compiled by Seaman engineers. Have you sent for your copy? Ask for Bulletin E-25.

Steel Piles Driven Deep For Building Foundation

H-Beams Welded to Form 120-Foot Sections; 1,600 Support 10-Foot Concrete Mat Under Tall Structure

By WILLIAM H. QUIRK,
Eastern Editor

✦ IN the Back Bay section of Boston, Mass., bed rock lies 155 feet below the surface. This created a problem in the construction of a suitable foundation for the new $15,000,000 addition to the home-office building of the John Hancock Mutual Life Insurance Co. A foundation for this 470-foot 26-story skyscraper could rest on nothing but rock. This was achieved by welding 14-inch 117-pound steel H-sections together to form piles about 120 feet long, and driving them through the overlying clay, silt, and hardpan. Over the 250-foot square site 1,637 piles were driven, and on top of them a 10-foot reinforced-concrete mat has been poured on which the steel framework for the building will be erected. The big structure is being built by the Turner Construction Co. of New York City which sublet the pile driving to the Raymond Concrete Pile Co., also of New York.

The present John Hancock Boston office is an 8-story structure, built in 1921, and fronts along Clarendon Street between St. James and Stuart Streets. The new building will occupy the rest of the block, east to Berkeley Street, which was razed between January and March, 1946. Among the buildings removed was old John Hancock Hall, a 72 x 100-foot auditorium adjoining the rear of the original building, and having a foundation of 31 concrete caissons with a maximum depth of 25 feet. The shafts of the caissons were 3 feet in diameter, but at the bottom they were belled out to over three times that size.

Excavation

Turner Construction Co. proceeded to remove these massive caissons by cutting them up into 4 to 5-foot sections with a couple of Ingersoll-Rand Jackhamers powered by an I-R 500-cfm compressor. Because of the closeness of the office building, no blasting was done, plug and feather drills being used to effect the breaks in the concrete started by the Jackhamers. A Lorain crane with a 50-foot boom lifted the pieces from the holes with steel cable. At one end of the old foundation, water was encountered, making it necessary to construct a cofferdam before the bell bottoms of some of the caissons could be removed.

Steel interlocking sheet piling, 30 feet long, was driven by a McKiernan-Terry hammer hung from the crane without leads, to form a 25 x 30-foot cofferdam. Three tiers of 14-inch H-beams were used for horizontal rangers, with another set at the center for cross bracing. A Novo 4-inch pump kept the hole unwatered until the last of the old concrete foundation was lifted out, after which the sheeting was removed by a Vulcan 800A pile extractor.

A contract for excavating the site was sublet to the Walter Reed Corp. of Boston who, in the meantime, started the excavation with three Lorain shovels, of 2, 1¾, and 1½-yard capacity. A fleet of about 20 trucks hauled the material to Trainor's dump in South Boston, a 5-mile haul. Because of the ring of buildings surrounding the site on all four sides, the excavation could not be made at once to the depth of 46 feet below the street which is the level of the bottom of the concrete-mat foundation. The removal of that great weight from a central area would endanger the buildings on the adjoining streets. Accordingly the first cut was made to 0 elevation, or 20 feet below the street, with 1½ to 1 slopes down from the sidewalk on three sides with the existing building on the remaining side. A ramp was made with an exit on Stuart Street. This phase of the excavation was completed by May 15, with 50,000 cubic yards having been removed.

C. & E. M. Photo
This general view of the foundation operations for the new John Hancock Mutual Life Insurance Co. building in Boston shows, at the extreme left, the present 8-story building of the company, as well as the rigs for handling and driving the piles.

Steel Foundation Piles

While the excavation was under way, the 14-inch 117-pound steel H-beams were being shipped from the Sparrows Point, Md., plant of the Bethlehem Steel Co. and also from the Homestead, Pa., plant of the Carnegie-Illinois Steel Corp. to a yard of the Boston & Maine Railroad in Charlestown, across the Charles River from Boston. The yard and its facilities, including a Browning 25-ton locomotive crane and a Milwaukee 50-ton gantry crane, 100 feet long x 50 feet wide, were rented from the Railroad. While the required length of the pile beams ranged from 88 to 120 feet, the length of the sections as they were received at the yard varied from a

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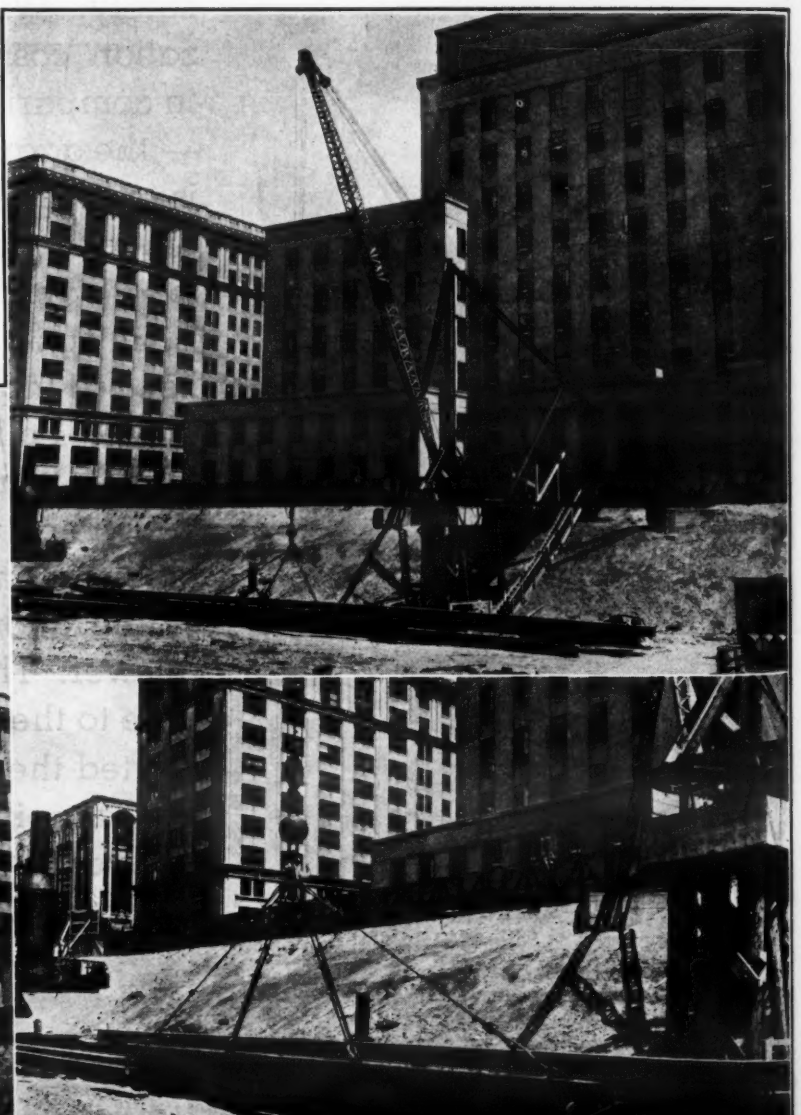
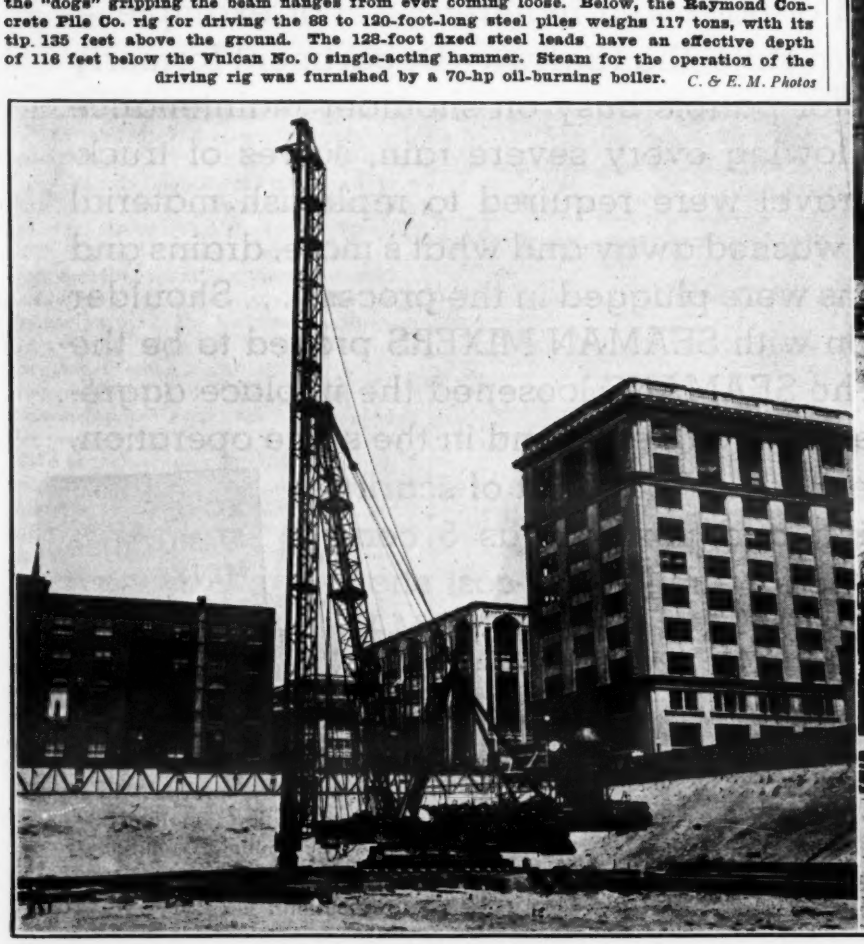


Right, this stiffleg derrick, with a 75-foot boom operated by a 2-drum Mundy hoist powered by a Waukesha gasoline engine, unloaded the 117-pound H-beams used for foundation piles from a truck trailer in the street, swung them over the fence, and lowered them to job level. The lifting device at the end of the derrick boom, shown at bottom right, consisted of a 14-inch H-beam, 40 feet long, with four connections, each having two ⅝-inch cables. At each end of the lifting beam was a locking safety device which prevented the "dogs" gripping the beam flanges from ever coming loose. Below, the Raymond Concrete Pile Co. rig for driving the 88 to 120-foot-long steel piles weighs 117 tons, with its tip 135 feet above the ground. The 128-foot fixed steel leads have an effective depth of 116 feet below the Vulcan No. 0 single-acting hammer. Steam for the operation of the driving rig was furnished by a 70-hp oil-burning boiler. *C. & E. M. Photos*



Steel Piles Driven Deep For Building Foundation

(*Continued from preceding page*)

basic 65, the usual length, up to 100 feet.

The steel mills were equipped to roll piles in one length up to 120 feet for this operation. However, should all piles be delivered in one piece, there would be considerable short stock left over at the end of each ingot rolling. It was found that piles in one length could be economically rolled up to a third of the job's requirements, and the balance of the piles spliced from the shorter remaining pieces. In shipping the full-length piles, a combination of five cars proved to be the most efficient method, with a load of twelve piles carried on the second and fourth cars. The first, third, and fifth cars were used as idlers.

The locomotive crane usually unloaded the beams, placing them beneath the gantry where they could be readily picked up and set in the jigs for welding. To support the heavy beams in the jigs, nine concrete bases were constructed, 2 feet wide x 2½ feet deep x 18 feet long. Made up specially in a machine shop, the steel jigs consisted of a circular strip 3½ inches wide with a 2-foot diameter, and a 9-inch bearing plate at both the top and bottom of the ring. The lower half of the jig was secured to the concrete base, and the upper half was removed while the beams were eased to position on the lower bearing plate by the gantry crane. Then the upper half was bolted into position so that both bearing plates were flush against the flanges of the beam. The circular clamp rested on two rollers so that the beam could be rotated in a complete circle.

Before starting the welding, an oxy-acetylene torch burned a 45-degree bevel into the ends of the two beams that were to be connected so that they framed in to each other. Then a 9 x 9 x ⅝-inch plate was welded to each flange of one beam, with the square plate placed like a diamond with a triangular half projecting for a connection to the other beam. Then the two beam ends were brought to within 5/16 inch of each other, the diameter of a welding rod, and securely fastened in the jigs. The welding was done by the Harding Welding Co. of Boston which set up a battery of twelve Westinghouse 300-amp electric arc welders on one side of the beam yard. With this circular-type jig moving on rollers, it was possible to rotate the beams and join them together with down hand welding, the most desirable method of welding. The two flange plates, and a web plate of the same size but only on one side, were made fast to the beams by welding from the top and against the plates.

Handling the Beams

After being welded, the long sections of steel beams were loaded by the cranes on to a specially built trailer truck, 10 feet wide and 50 feet long, with a capacity of three beams to a load. The hauling was done by C. E. Hall & Sons, Inc., of Boston, Mass., who made the 4-mile haul with the weighty 120-foot beams from Charlestown, across the Charles River and through the narrow, tortuous, winding streets of downtown Boston and out to the Back Bay area without incident.

To unload the beams at the job site and lower them into the excavation, a stiffleg derrick with a 75-foot boom was set up on the side slope of the excavation just off Berkeley Street. For a foundation, eight wood piles, 55 feet long with 8-inch tips and 15-inch butts, were driven 35 feet into the ground. The 20-foot projecting ends were capped with a concrete block, 6 x 8 x 3-foot thick, with the piles projecting half way into the concrete. The mast, boom, and bull wheel of the derrick were anchored to this foundation, while the side braces were secured to 8 x 8 x 4-foot concrete blocks resting on five wooden piles driven almost at the top of the slope. A 2-drum Mundy hoist powered by a Waukesha gas engine activated the derrick.

The derrick picked each beam from the trailer, swung it over the fence which surrounds the site on three sides, and lowered it to the ground. A special lifting device was used so that the great weight was not suspended from one point. It consisted of a 14-inch H-beam, 40 feet long, with four connections to the lifting hook of the derrick, each with two ⅝-inch cables. At the ends of the lifting beam were clamps which fastened to the flanges of the pile. These clamps were equipped with a locking safety device to prevent the "dogs" gripping the beam flanges from working loose.

Although the pile driver could be moved so as to pick up the beams itself, much time was saved, and the pile driver left for the more important work of driving piles exclusively, by having a Manitowoc 20-ton Speedcrane with a

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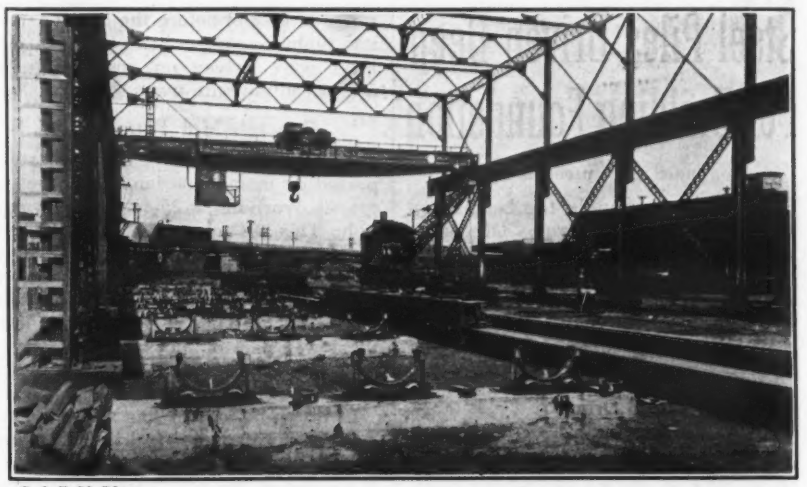

C. & E. M. Photo

Steel foundation piles were unloaded at a yard of the Boston & Maine RR in Charlestown. A Browning 25-ton locomotive crane removed them from the cars, and the 100-foot-long x 50-foot-wide Milwaukee 50-ton gantry crane placed them in the jigs for welding to the proper length.

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Steel Piles Driven Deep For Building Foundation

(*Continued from preceding page*)

60-foot boom rehandle the beams and walk them to the driver. Of course when the driving rig was close to the stockpile of beams the rehandling crane was unnecessary. A 3-part lifting line was used in picking up the piles and suspending them in the leads of the driver.

Pile Driving

Pile driving started near the end of May with from 8 to 10 piles being driven on an average during the 8-hour work day. It was a tedious business hammering these long, steel beams through the successive layers of silt, clay, and hardpan until they came to a bearing on rock 155 feet below the level of the street. For even after the piles were driven flush with the level at which the rig was working, they were then sunk an additional 21 feet or so. A steel follower was used to drive them that extra distance below the surface. The follower or spud was a 14-inch H-beam, 25 feet long, with ¾-inch plates welded to the sides between the flanges to form a square section. At one end was a bonnet or head for slipping over the top of the pile when driving the extra depth. Thus the piles were not left sticking out of the ground when the excavation was completed later on to the founding depth of 46 feet below street level.

The piles were placed by a Raymond-made universal 117-ton driver, which is the tallest of all the company's rigs, with the tip 135 feet above the ground. It has a 70-foot boom and 128-foot steel fixed leads with an effective depth of 116 feet under the Vulcan No. 0 hammer whose ram was built up from the standard 7,500 to a weight of 10,000 pounds. The single-acting steam hammer falls 39 inches, and with allowance for friction and possible back-pressure losses it strikes a 32,000 foot-pound blow onto the steel. Steam was generated in a 70-hp oil-burning boiler which was converted from coal when the coal strike last spring threatened to tie up operations. The driver can swing 360 degrees on its turntable and is moved on chock rollers; it has a lateral driving range of 48 feet before the base of steel and timber members have to be shifted. Piles were driven on an average of 5-foot centers both ways.

Concrete-Mat Foundation

The Back Bay area of Boston is supported on man-made land of 20 feet of gravel overlying a 25-foot silt formation. This silt formation does not give up its water readily. Likewise, it does not absorb water to a great degree unless unduly disturbed. Therefore, the volume of ground water is found in the lower part of the sand and gravel fill to a depth of 5 to 6 feet, just overlying the silt.

In order to control this water, an 8-inch perforated-metal drain was installed in a gravel trench at the level of the top of the silt. These pipes were sloped to two pumping stations at opposite corners of the lot. One 2-inch and one 3-inch pump were all that were required to handle the water during the first phase of excavation and pile-driving operations.

As the driving was completed over a portion of the area, excavating was resumed with a backdigger until the tops of the piles were reached, and then a clamshell removed the remaining few feet of dirt down to elevation –25.625 or the level of the bottom of the 10-foot concrete mat. The piles project from 3½ to 5 feet into the concrete.

Great caution had to be exercised in making this second cut because of the danger of disturbing the foundations of the surrounding buildings by removing too much weight from this central area. Accordingly a wall of sheeting was constructed around the perimeter of the site at the toe of slope, or the building line, which is approximately 30 feet in from the curb. This consisted of 12-inch 53-pound steel H-beams driven as columns on 8-foot centers, and connected by 4-inch timbers. The sheeting was braced by structural members placed against the concrete foundation as it was poured.

The concrete mat was poured in checkerboard fashion in sections measuring 20 x 35 feet, of which 97 were required. Again the progress of this work was carefully planned in coordination with the excavation so that as dirt was removed the displaced weight was compensated by pouring a section of concrete mat. These precautions resulted in a smooth-running job with no trouble from the street caving in around the sides, or disturbances of neighboring foundations.

Truck-mixed concrete was used in pouring the mat which got under way in September, and is expected to be completed early in 1947. A force averaging 100 men was employed.

Critics' Corner

So that the neighborhood residents and passers-by could see what was going on behind the high corrugated-metal fence enclosing the job site, the Turner Construction Co. built a grandstand and named it the "Critics' Corner" for the convenience of construction connoisseurs. Visitors enter through a door

(*Concluded on next page*)

COFFING HOISTS

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Superintendents - Foremen

Have long been specifying COFFING "SAFETY-PULL" Ratchet Lever Hoists for all kinds of lifting and pulling jobs in their construction and maintenance work. These light weight, portable time and labor saving hoists are built in capacities ranging from ¾ to 15 tons yet they weigh only 14 to 150 pounds.

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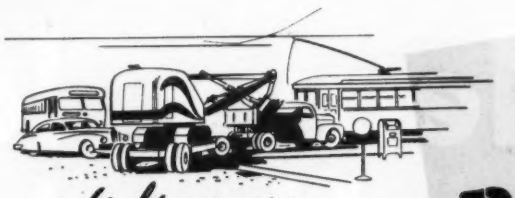

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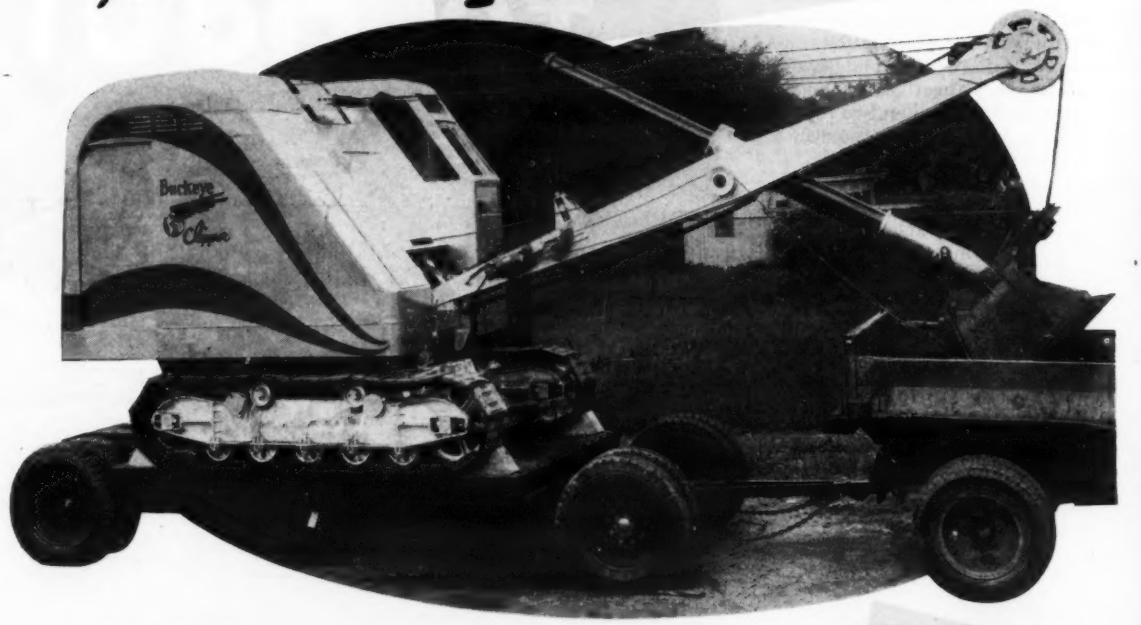
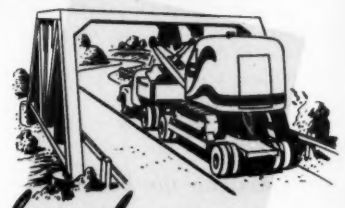


THE BUCKEYE MODEL 70 CLIPPER IS A "SNAP" TO MOVE FROM JOB TO JOB

If you're looking for a smooth-working shovel that will wipe away your inter-job transportation frowns, sail along with the graceful Clipper. Think of a ¾-yd. shovel that you can load on a light trailer and haul behind a 1½-ton truck. That's the Buckeye Model 70 Clipper.



Tops in portability, the Clipper also heads the list in convertibility. It's five machines in one... power shovel, trench hoe, dragline, crane, pile driver. From the ground up, Clippers are built for faster digging and material handling. All clutches are engaged and brakes applied by Mevac—smooth, vacuum power. Vacuum power trips the dipper, too.

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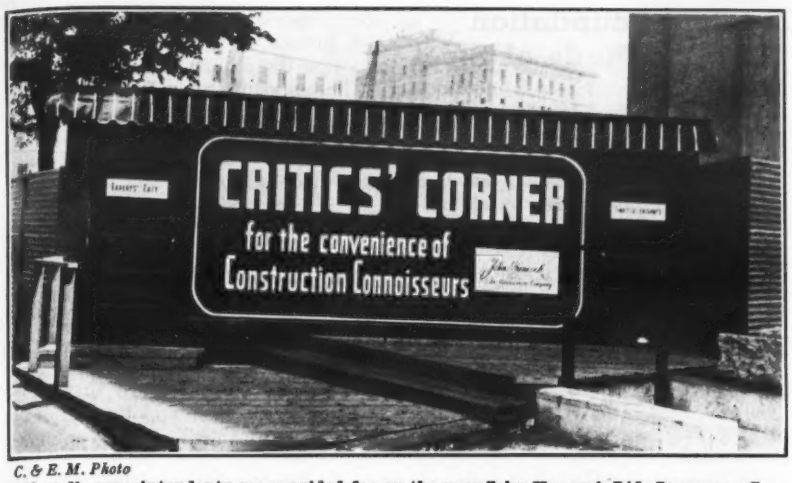

C. & E. M. Photo
Sidewalk superintendents are provided for on the new John Hancock Life Insurance Co. building project by this enclosed observation booth, with an "Amateurs' Entrance" at the right and "Experts' Exit" at the left. Inside, long wooden benches at different levels afford a full view of the construction operations.

Steel Piles Driven Deep For Building Foundation

(Continued from preceding page)

marked "Amateurs' Entrance" and leave through one marked "Experts' Exit". Inside the canopied observation booth, sidewalk superintendents can overlook the entire 62,500 square feet of job site and see the men and equipment at work. For their comfort they may sit on two long wooden benches arranged at different levels to afford an uninterrupted view of the operations.

The casual observer might have overlooked a core-boring machine working at one end of the lot, since it was almost dwarfed by the towering driving rig, derrick, or long-boomed cranes. Its operators, however, undistinguished by their clothes from the rest of the workers, were a couple of young scientists, Frederick Johnson of the R. S. Peabody Foundation at Phillips Academy, Andover, Mass., and Sheldon Judson of the Department of Geology at Harvard University. They were extracting a 2-inch core of unconsolidated deposits out of the earth in 3½ to 4-foot sections until rock was reached well over 100 feet below.

The long core was divided longitudinally into four quarters for examination and analysis by scientists from Harvard, Phillips Academy, and Massachusetts State College at Amherst. Each was examined from a different approach. One section of core was used for mechanical analysis to determine its geologic make-up; another was scrutinized for the presence of pollen; the third was inspected for diatoms, microscopic vegetable organisms with a shell of silica found in fresh or salt water; and the last quarter was examined for foraminifera, minute salt-water animals with a shell belonging to the protozoa.

All this activity was inspired back in 1941 when this same contractor, Turner Construction Co., was building the New England Mutual Life Insurance Co. building only one block away on Boylston Street. When excavating for the foundation, the constructor came upon an old Indian fish weir of great size, and halted operations so that their discovery might be studied by scientists. The weir had been constructed of sticks from 4 to 6 feet long and 2½ to 3 inches in diameter, sharpened at one end with a stone axe so they could more easily be driven into the shallow bay. For according to the scientists, the present Boston Back Bay section was really once an inlet of the sea which was then 12 feet below its present level.

By studying this fish weir, from which the enormous number of 65,000 pieces were obtained, and by correlating the findings with the geologic formations of the area, authorities feel that it was made around 2,000 B. C. This contrasts sharply with the usually accepted theory that the advent of the so-called Indians into the western hemisphere from Mongolian Asia via the Bering Straits and Alaska was of a much later date. When the core analysis is completed, the scientists may be able to throw more light on the age of the neighboring fish weir and on the Indians who built it.

Personnel

In constructing the new addition to the John Hancock Mutual Life Insurance Co. building, the Turner Construction Co. is represented by M. H. Parsons, Project Manager, and R. B. Hazard, Superintendent. E. Whiteley and Bill Thompson were Superintendents for the Raymond Concrete Pile Co. Cram & Ferguson, Boston architects, designed the structure which will have about 625,000 square feet of working floor space and will dominate the Boston skyline. There will be two 8-story wings, with the central section rising 26 floors, topped by a lantern tower and spire reaching almost 500 feet above the sidewalk. The 26th floor will have many observation points which will afford the general public the best view of Greater Boston. R. C. Pitcher is representing the architects and the owners on all phases of the construction.

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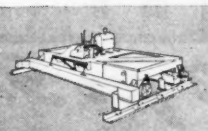
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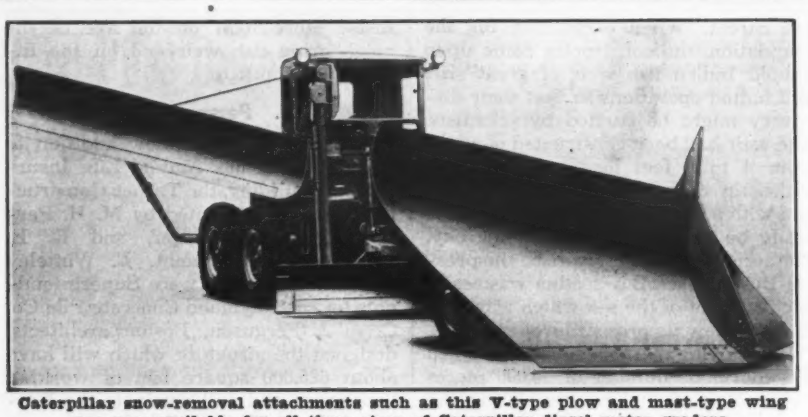

Caterpillar snow-removal attachments such as this V-type plow and mast-type wing are now available for all three sizes of Caterpillar diesel motor graders.

Snow-Removal Blades Convert Motor Grader

New and improved snow-removal attachments are now available for the No. 212 motor grader as well as the No. 12 and No. 112 made by the Caterpillar Tractor Co., Peoria 8, Ill. These attachments include the V-type snow plow, mast-type snow wing, and reversible one-way plow and bulldozer.

The snow wing and bulldozer are new to the Model 212 motor grader; they are designed to give it the same year-round utility claimed for the No. 12 and No. 112 motor graders. The company states that marked improvements in the operation of the mast-type snow wing have been effected in all sizes, with modifications which insure smooth parallel lift with both ends of the blade elevated simultaneously.

The mast-type snow wing for the smallest grader has a 10-foot blade, 27 inches high, with a weight of 1,500 pounds. The reversible one-way plow and bulldozer is 8 feet 6 inches wide, 28 inches high, weighs 1,740 pounds, and has a lift of 12 inches.

These attachments are described in an illustrated color folder issued by the company. Form 10181 gives the basic specifications and principal features of these attachments, treating them editorially as well as pictorially.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 1.

Hough Promoted by Smith

The appointment of George P. Hough as Executive Administrator of its Chicago District, replacing Don T. Allen who recently resigned, has been announced by the A. O. Smith Corp. of Milwaukee. Hough has been with the company since 1939.

Some of the products made by the Smith organization include welding electrodes and equipment, highway-joint steel, and railroad crossing plates.

Concrete Foundation Forms Made of Steel

Steel forms for concrete foundations have been announced by the Irvington Form & Tank Corp., 43 Cedar St., New York, N. Y. These Atlas forms are made in two types: Type A which leaves a minute fin 1/16 inch high, easily removed; and Type B which leaves only a hair line, with nothing to remove.

Standard widths are 6, 8, and 10 inches, with others supplied to order. Standard heights are 5, 8, and 10 feet, with others obtainable. The weight per square foot of contact surface is approximately 8 pounds. Sections are joined by wedge bolts furnished for lateral connection at 12-inch centers. End connections are by ½-inch bolts and clips where desired. The units are designed to line up accurately and fit together tightly.

These forms require no studs or joists, and union carpenters are usually permitted to handle them, the manufacturer says. Forms are painted with one coat of special form varnish on the contact surface and one coat of protective paint on the other side.

The company rents as well as sells these forms, and furnishes engineering and layout service for each job, if requested. It will also send a trained supervisor to instruct the men on the job, if necessary.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 2.

Manager, Drill-Steel Firm

It has been anonunced by the New York Steel & Rock Bit Corp. that James H. Markley has been appointed General Manager of the firm's newly equipped warehouse and plant located at 1211 Wyatt St., New York City. The bit-sharpening shop is now ready to supply new and reconditioned hollow drill steel, bits, moil points, rethreading, reshanking, etc. The company also maintains facilities for annealing and other heat-treating methods.

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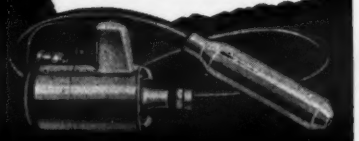

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Concrete Pavement On Relocated Highway

Existing Gravel Road Is Realigned and Paved by Contract; Curves Are Bad Job Problem

(*Photo on page 1*)

✦ "THE paving job that's 50 per cent curves" was well known to midwestern contractors last summer. Located on Highway 52 south of Dubuque, Iowa, the job attracted regional attention because the predominance of curves made concrete work difficult. Western Contracting Corp. of Sioux City is paving the 15-mile Federal-Aid road, under contract to the Iowa State Highway Commission.

The old road was first built in 1920, and the replacement of its narrow graveled surface was high on the priority list of the Iowa State Highway Commission last year. About half the new highway is in a new location. When it is finished in May, 1947, it will have wide, sweeping curves to replace the present tortuous bends.

The new road now under construction will be a two-lane pavement 20 feet wide, with raised curbs on all low sides. The Class A concrete is reinforced because the subgrade is predominantly clay, although some rock cuts have been encountered in grading. The 10-foot shoulders, which will grow up naturally in timothy and bluegrass, will blend easily with gentle backslopes.

The new pavement, poured in a single pass, has no longitudinal joints. But it does have a plane of weakness down the center created by the use of a dummy joint. Expansion joints every 120 feet and dummy contraction joints on 30-foot centers will take care of all longitudinal movement. The concrete pavement is 10 inches thick at the sides and 8 inches thick in the center, crowned gently. The top of the pavement is crowned on level sections and poured flat on the curves.

When work started, the road was closed to traffic, and all southbound cars were detoured over Highway 61 outside of Dubuque. This reduced through traffic to those farmers who have to use the road to get to market. The 10-foot earth-shoulder strip on both sides has served to take essential traffic through the job.

Form Setting and Fine-Grading

When excavating equipment moved off the rough grade, any irregularities were taken care of, in the setting of steel forms, by bringing in a Cleveland form grader and cutting a foundation true to line and grade as established by state highway surveyor's stakes.

Western Contracting Corp. managed to purchase some new paving equipment last year, including 5,000 linear feet of Heltzel steel forms.

For months new forms have been the dream of paving men who have had to fight bent corners and crooked gates. On this job two brothers, A. E. and C. E. Marsh of Falls City, Nebr., managed to dig part of their own form trenches and set forms 1,400 feet ahead of the paver each day in a 10-hour shift.

Form setting on this job followed a definite pattern. Early in the morning they dug form trenches well out ahead. By the time they had run a string line for grade and alignment, the first load of forms stripped from the first portion of the previous day's pour had been brought up by a Ford flat-bed truck, equipped with a cable hoist and a boom that would turn 180 degrees. The forms were unloaded on the ground only about 2 feet from their final location.

These sections weigh 240 pounds apiece, but the Marsh brothers seemed to go about their job of handling them by hand with extreme good nature. It

(*Continued on next page*)

C. & E. M. Photo
A Caterpillar D6 tractor pulls a Carr subgrader along the grade preparatory to laying concrete on the Western Contracting Corp. 15-mile job near Dubuque, Iowa.

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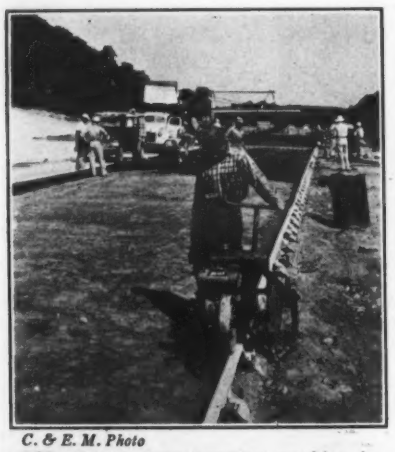
the "545"—heavy duty pneumatic-tired Bucket Loader . . .

Here's a Bucket Loader that hits right at today's need for mobility, high capacity and all-round usefulness. The 545 is B-G engineering at its finest and is way ahead with advanced performance features that include: two-wheel drive for fast maneuvering in cramped quarters and road speeds up to 10 m.p.h. It has the power and traction you want, too—three forward speeds and a fast reverse. Finally, it has the best of the B-G features proved on its companion crawler-mounted model such as: synchronized speed feed that keeps the bucket level and the horizontal resting boom for road travel or transport. And of course, it has the B-G stamina that minimizes maintenance. See your Barber-Greene distributor or write Barber-Greene Company, Aurora, Illinois.

BARBER-GREENE COMPANY · AURORA, ILLINOIS

Constant Flow Equipment

LOADERS PERMANENT CONVEYORS PORTABLE CONVEYORS COAL MACHINES BITUMINOUS PLANTS FINISHERS DITCHERS



C. & E. M. Photo
This Jaeger form-tamping machine is compacting the dirt around the base of Heltzel road forms used on the new Dubuque-Bellevue highway.

Concrete Pavement On Relocated Highway

(*Continued from preceding page*)

is the kind of job that gets mighty tiresome by 2 p.m., and by 6 p.m. it will make the old lady think the old man has stepped out on her sure enough! The brothers handled exactly 63 pieces, by actual count, before they straightened up for a deep breath the day the job was visited for CONTRACTORS AND ENGINEERS MONTHLY. That is 15,120 pounds of steel without a rest!

The steel pins for forms were driven by a third man, who also made the final alignment. A Jaeger form-tamping machine tamped both sides of the steel forms, and sprayed the forms with paraffin solution at the same time.

Fine-grading excess material between the forms was handled by two Carr subgraders and a Caterpillar No. 12 motor grader. The motor grader passed first over a section, usually about 500 feet long. Then a Carr subgrader, towed by a Caterpillar D6 tractor, brought all excess material on up ahead. If excess material built up too much, the D6 dropped the subgrader and picked up a small LeTourneau Model G Carryall. This excess material was wasted on the shoulders.

The subgrade was tested all the time this fine-grading was taking place by a grade boss. He stretched a string from the top of both forms, pulled it taut, and checked the center with a rule. Clearance between the string and the ground must be 8 inches in any case. A 2-inch crown is put in the subgrade under flat pavement, and of course 4 inches of subgrade crown must be made if the top of the pavement is to show a 2-inch crown. This high crown goes in all the straightaway sections.

The subgrade was cut to neat lines, and the forms again checked visually for alignment. An International tractor with two rubber tires on its front wheels and two 24-inch smooth-steel rear wheels, heavily ballasted with concrete, was used to compact the final subgrade ahead of the paver. This subgrade crew finished about 140 linear feet of base an hour.

The subgrade under the concrete pavement was covered by rolls of asphaltic paper, 38 inches wide. When the paver was spotted on one side of the slab, this paper could be rolled out well ahead. But a great part of the job will be poured with the paver in the middle of the forms. In that case the paper has to be rolled out as close as possible to the paver and kept that way.

Paving, Labor Problems

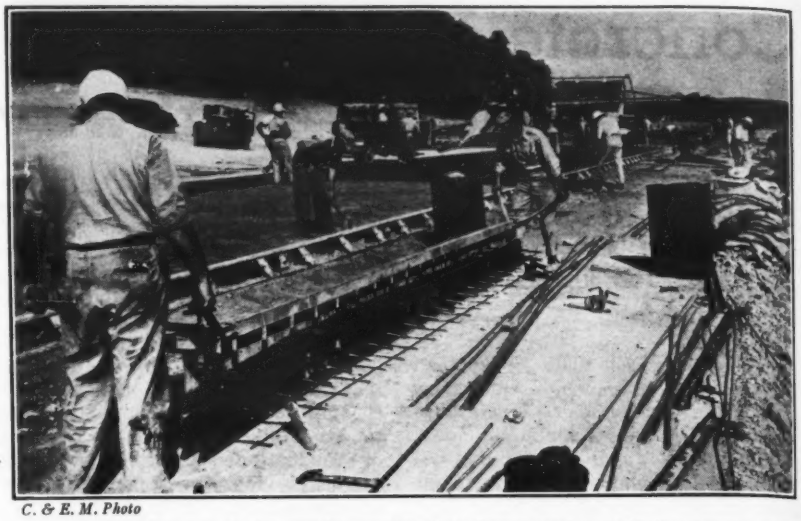
The mixing of Class A concrete was done by a Koehring 34-E Twinbatch dual-drum paver with a 35-foot boom. It was spotted on the shoulder the day the job was visited. Most of the mixing water was supplied by 4-inch multiple-stage pumps through a header pipe laid from St. Donatus Creek. Tees were located every 200 feet, and water fed to the paver through about 250 feet of flexible rubber hose. Water valves were set ahead at the end of a day's run. Mixing time is 60 seconds, and water is controlled to give a 1½-inch pouring slump, measured in a 12-inch cone.

As the concrete was mixed, the operator spread it over the subgrade through the dual-gate bucket on the paver boom. A Blaw-Knox machine spread the concrete and shaped the top.

Pouring around curves has been no trouble with the Blaw-Knox spreader, but the constant adjustment necessary on the other machines has hampered operations. Efforts were made to teach new men these adjustments so they could make them rapidly, but the labor turnover was discouraging.

Pouring, as a whole, lagged somewhat below expectations, primarily because of a shortage of experienced labor. One day the contractor poured with four new and inexperienced operators! Although Western Contracting Corp. offered as an inducement free transpor-

(*Continued on next page, Col. 4*)



C. & E. M. Photo
Two men pick up one of the special construction forms used to hold the dowels and asphaltic material for expansion joints; it will be set inside the steel forms.

Tune in . . .
TEXACO STAR THEATRE
presents the NEW
EDDIE BRACKEN SHOW
every Sunday night.
Metropolitan Opera broadcasts Saturday afternoons.

TEXACO
REG. T.M.

TEXACO

Front-End Spreader

Details of the St. Paul front-end spreader are described in a bulletin distributed by the C & F Machine Works, 645 University Ave., St. Paul 4, Minn. This unit is adaptable for spreading all kinds of material, such as cinders, chips, crushed rock, sand, calcium or sodium chloride, and lime.

By spreading from the front, the truck is able to travel in its own lay of material, thereby adding to the amount of traction available on an icy pavement. Material is loaded in the rear hopper and carried to the spreader by a completely enclosed conveyor belt.

Distribution capacities claimed for the unit are from 25 to 100 yards of sand or chips per hour. Spreading widths are from 4 to 20 feet, regardless of the truck speed. The 28-inch fluted distribution disk is powered by a 4-cylinder air-cooled gasoline engine which delivers 22 hp at 2,600 rpm. The engine speed and special clutch units are controlled from the driving cab of the truck. The conveyor belt is of 4-ply construction and 10 inches in width.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 69.

C. & E. M. Photo

One of the pair of Iowa mules which pulled concrete skips on the Dubuque job stands here, entranced at the line-up of paving equipment shown in the background.

Concrete Pavement On Relocated Highway

(Continued from preceding page)

tation from Dubuque and Bellevue, and free pick-up of noon lunches, labor was very difficult to get. Sometimes one or two men would show up to catch the Dubuque truck, which normally hauled fifteen men. According to the Superintendent, if all the men carried on the office "active" files were to show up at once for a day's work, he would have about 2½ full crews! Such was construction labor in 1946.

However, there was one type of labor on this unusual job which recognizes no labor laws, age limits, or wages. That is a pair of long-eared black Iowa mules—jackasses, that is. They played a very vital and necessary part in the building of this new road. The mules were used to pull ½-yard skips of concrete from the paver dump to the work on curbs back behind the finishers.

Mules have a lot of horse sense. In fact, the only trouble with horse sense is that nobody but horses and mules have it. This pair seemed to know just when to buckle down to a load after the singletree had been hooked, and they knew where to stop in reference to the curb. The two skips they pulled were filled by a labor crew which also did the curb pouring.

The bedlam of mechanical noise around the paver and spreader disturbed the mules not at all. They seemed to thrive on it. A bag of oats at noon and one good cussing morning and evening kept them perfectly satisfied. In this day of parts shortages for mechanical equipment, one is apt to dwell on the never-ending obedience of these two Iowa hybrids, and to wonder just how much of an improvement the mechanization of construction jobs is, after all.

Finishing and Joints

The curbs were poured at the same time the slab went down. Raised curb forms, bolted to the Heltzel steel forms by a clamp, were used to shape the back. The sloping front was put in by a special hand-finishing tool operated by one man, and final trimming done with wood trowels.

Behind the Blaw-Knox finisher-spreader came a Jaeger-Lakewood double-screed float finisher with vibrators carried on the front. This machine put the initial float finish on the concrete slab. One puddler tended it. His job was to keep the excess concrete shoveled ahead at the wheels.

A Flex-Plane machine followed the Jaeger-Lakewood, to cut the center slot and to install the dummy contraction joints. The center strip was installed so that it will barely show when the pavement is finally finished. It will be the guide for the center striping after the job of pouring is finished, though this, of course, is not its primary function.

A Koehring Longitudinal Finisher followed the Flex-Plane, and put the second float finish on the concrete. Two men with long-handled wood floats and two men who operated a belt for the final finish were all active on any day's pour.

The finished slab was cured by placing wet burlap on the surface for the first 24 hours. It was watered down at least four times during this period. Then the burlap was removed and Amulco curing asphalt applied by spray. Forms were stripped by the winch on the Ford truck referred to earlier, after the pins were extracted by a Cleveland form puller.

The 24-inch round steel dowel bars for expansion and contraction joints arrived on the job spot-welded to two steel bars. On the expansion joints the

(Concluded on next page)

JOBS LIKE THIS...

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GOODBYE bearings if that mud ever works its way into them! Put *Texaco Marfak* into a bearing and here's what happens —

Marfak stays where you put it. It doesn't squeeze out when the load is heavy, doesn't jar out when the going is rough. *Marfak holds together.* It clings to the bearing — guards it with a persistent lubricating barrier against dirt and moisture. It protects parts better, longer, with fewer applications.

In wheel bearings, use *Texaco Marfak Heavy Duty.* Here the secret of long-lasting protection is *Marfak Heavy Duty's* ability to form a fluid lubricating film inside the bearing while retaining its original consistency at the outer edges — thus sealing itself in, sealing out dirt and moisture.

Best testimonial to Marfak effectiveness is this fact: *More than 250 million pounds of Marfak have been used to date!*

Use the Texaco Simplified Lubrication Plan for contractors' equipment. For information, call the nearest of the more than 2300 Texaco distributing plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

GET FULL ENGINE POWER

Your heavy-duty gasoline and high-speed Diesel engines will run more efficiently and deliver more power when lubricated with oil that keeps them clean—*Texaco Ursa Oil X★★*. Made especially for this service, *Ursa Oil X★★* is fully detergent, dispersive, and has high resistance to oxidation. It keeps rings free, assuring better compression and combustion — great power and fuel economy. It protects bearings from corrosion, greatly reduces engine wear and maintenance costs.

Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

C. & E. M. Photo
The bin of a Johnson batching plant is served by a Koehring clamshell, on the Western Contracting Corp. job, as a batch truck receives its load for delivery to the paver.

Concrete Pavement On Relocated Highway

(Continued from preceding page)

20 dowel bars are ¾-inch in diameter, spaced 4¼ inches from the bottom of the slab and 6 inches away from the forms. Expansion-joint material is 1 inch thick, of premoulded asphaltic material. It is placed in two 6-foot lengths and two 4-foot lengths to meet the subgrade slope. Dowel pins are greased and capped with tin. The whole expansion-joint assembly is set in place on steel chairs, and the top of the mastic is held in place by a metal cap. After the burlap is stripped the 1-inch-deep slot on each expansion joint is poured full of liquid asphalt.

Contraction joints are also reinforced by dowel bars, set in the same manner. The transverse steel reinforcing is held up by steel chairs which are pulled out and moved ahead by one man as the paver moves forward. All reinforcing steel is placed in the approximate center of the pavement.

Batch Plant

To take care of batching for the concrete, identical plants were set up, one at each end of the job. This was done so that pouring could continue without any interruption and still keep the aggregate haul to a minimum.

Marquette bulk portland cement was shipped in to Bellevue in hopper-bottom cars and unloaded into a dump hopper. Dewey cement was also used on half the job. A screw conveyor hoisted cement directly to International 10-ton trucks, which hauled it to a 100-barrel and a 300-barrel Johnson batching bin. The 100-barrel bin was located at the eastern end of the job.

River gravel for concrete aggregate, along with sand, was furnished by a commercial plant at Bellevue. It was hauled to the Johnson 3-compartment bins by International trucks, all owned and rented under subcontract from Grey Motor Co. of Milwaukee on a tonnage basis. A Koehring Model 605 with a 2-yard Owen clamshell kept the bin filled.

Batches of 34 cubic feet were weighed out of the Johnson plants, and dumped to the trucks which backed under them. The mix consisted of 2,242 pounds of gravel, 1,893 pounds of sand, and 758 pounds of cement. The cement was added as the trucks drove under the bulk Johnson bin.

About 60 batches had to be on the road to keep the paver operating at its capacity. Twelve trucks which carried 2 batches were used, with nine trucks hauling four batches. The larger trucks are not quite as maneuverable in close quarters, but the shortage of trucks has been so acute through Iowa that the larger size was used from necessity.

Personnel

On-the-job officials at the time the job was visited included Austin Daily, General Manager for Western Contracting Corp.; H. O. Knisley, Paving Superintendent; and F. B. Thillen, Resident Engineer for the Iowa State Highway Commission.

Fred R. White is the Chief Engineer of the Iowa State Highway Commission, and the construction features were supervised generally by Construction Engineer A. A. Baustian, with headquarters at Ames.

When this new section is finished, southbound traffic from Dubuque will have a through pavement all the way to Bellevue. The present job will speed traffic through one of the state's bad routes which had outgrown its usefulness.

Carbon-Monoxide Alarm

A carbon-monoxide alarm has been designed for protection against dangerous concentrations of carbon monoxide in the air, in garages and maintenance shops, or wherever this hazard is present. It is described in a 4-page bulletin, No. DR-3, released by Mine Safety Appliances Co., Braddock, Thomas, & Meade Sts., Pittsburgh 8, Pa.

The alarm works continuously and gives visible and audible warning when carbon-monoxide concentrations reach a predetermined level. This setting can be made for concentrations as low as 2 parts per 10,000, a point at which a few hours exposure would be required to produce the first symptoms of carbon-monoxide poisoning.

In addition to describing the alarm, the bulletin explains the principle of operation. It contains information about the action and symptoms of carbon-monoxide poisoning, including an easily read graph which shows the extent and effect of possible blood saturation with progressive concentrations of carbon monoxide in the air.

The bulletin also contains a complete description of the M.S.A. instrument designed to control carbon monoxide in ventilating systems.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 70.

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A complete line for every type of Rock Drill, Pavement Breaker and Clay Digger.

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Here are some of the features that make the Euclid double-acting hoist unequalled for the heavy duty service of off-the-highway work on construction projects, in open pit mines and quarries, and on industrial operations:

Raises Loaded Body Fast . . . Engine speed controls dumping speed; ample hoist capacity for full payload.

Dumps the Load Clean . . . Hoist has 37" stroke which raises body to 70° from horizontal.

Provides Complete Control of Body . . . Conveniently located hoist valve has four positions: raise, lower, float, and hold. All or part of the load can be dumped according to job requirements.

Lowers Body Quickly . . . Hoist is double-acting in third stage . . . lowers the body under power to the point where it settles quickly by gravity.

Ask your Distributor or Representative to show you how all Euclid models, Rear-Dump and Bottom-Dump, are built throughout for efficient, long life in off-the-highway service.

The EUCLID ROAD MACHINERY Co.
CLEVELAND 17, OHIO

EUCLIDS *Move the Earth*

Wet Dirt Plagues Job Of Grading at Airport

(*Continued from page 2*)

tor graders were brought up on the line to maintain haul roads and to help in the processing of the fill.

One machine you would normally expect to find on a grading operation of this kind, a water wagon, was conspicuous by its absence. According to Mr. McVaugh, the problem was just the reverse. And what the rain missed in making loading difficult, Nature had already done in thousands of years when the soil was made. For underneath the top 2 feet of organic topsoil lay an 8-foot layer of wet rubbery clay; it was saturated in place with moisture which often ran as high as 32 per cent, and as high as 62 per cent in some 200,000 yards.

How to run a dirt-moving job to lower this water content turned out to be the issue of paramount importance all through the working seasons of 1944 and 1945. When work started on July 3, 1944, the topsoil had hardly been stripped away before tractors and Tournapulls began to mire down.

Civil Aeronautics Administration specifications called for a density on fills equal to at least 90 per cent of modified Proctor laboratory methods. Nothing near this figure could be developed unless the moisture content were lowered to 18 or 19 per cent.

Early in the job—and this method continued in use up to the very last day—it was necessary constantly to aerate the cut areas. At least two disks worked during all the daylight hours on a wet section. The next day they again moved over the same spot, turning the wet soil up with the serrated edges of disk blades. On the third day, if rain didn't fall to cross them up, the Tournapull and Carryall operators loaded the aerated ground and hauled it about 4,000 feet to the fill.

Disks were then used again all the remainder of that day to aerate the ground in place. Sheepsfoot rollers consolidated the soil to its proper density in five passes, seldom requiring more. This method of placing material was continued through long and weary months. It was the main reason why the grading part of the work ran over into penalty-clause time, according to Myron Price, Resident Engineer for the CAA.

Underneath the impervious and soggy layer of clay lay three kinds of decomposed rock which presented their own problem. The Dubuque Airport does not lie in the part of our United States which has a glacial history. Rather, it is an ancient lake bed, and all the formations are sedimentary. Underneath the soggy clay lay about 4 feet of yellowish-brown soil in the last stages of disintegration from rock. The oxidation of its iron content gave it its color. Under that layer was a stratum of yellow rock, some of it disintegrated, and finally a ledge of solid rock. Originally the CAA had estimated the rock excavation would run close to 225,000 cubic yards. But rock excavation was reduced to 50,000 cubic yards and posed no particular problem.

New Unit Tried Out

The development of all new earth-moving equipment is part of the steady march of construction progress. Following several years of engineering development and field tests, LaPlant-Choate Co., Inc., of Cedar Rapids, has come up with a new prime mover which is still considered in the experimental stage, but which will be in production for the working season of 1947. The new unit, which pulls a 14-cubic-yard earth-moving scraper behind it, was proof-tested by LaPlant-Choate at the Dubuque Airport in grueling work which was probably as tough as it will encounter anywhere, or worse.

Powered by a Hercules diesel engine, which develops 202 hp at 1,800 rpm, the new unit was clocked at a loaded ground speed of 21.76 mph loaded to capacity on a level road. Hauling conditions were dry and excellent the day this experimental machine was seen. Huge Goodyear Sure Grip 21:00 x 24 tires are used on both the prime mover and scraper to give better bearing values on haul roads.

C. & E. M. Photo

This close-up of D8 pusher tractors and a Super C Tournapull in the borrow pit shows the tough loading conditions on the McVaugh-Haynes Co. grading contract.

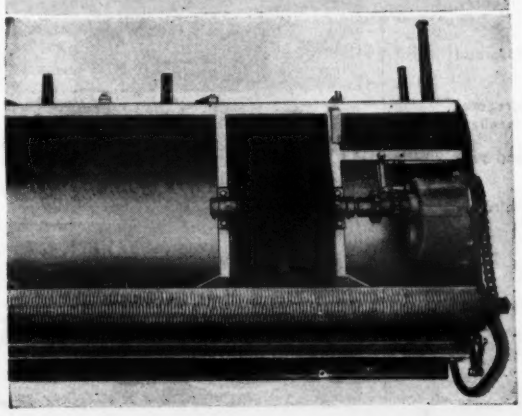
Compaction

Density tests on compacted soil were made by CAA technicians. Observations made after two freezing winters indicated that compacted soil retained all its density beneath the frost line, but lost a part of it in the frost zone. Soil which showed a density of 70 per cent in its native state before processing returned to very nearly that figure after the frost had acted upon it.

(*Concluded on next page, Col. 2*)

SET THE FEED . . . GO ANY SPEED

Wheel shaft of spreader drives feed roll through transmission .... Speed of feed roll rotation increases or decreases in exact proportion to increase or decrease of wheel rotation. Result is an even material feed per foot of travel as set by the shutter bar . . . no matter how fast or varied the speed may be. Transmission shifts for travel either forward or backward. Shutter bar adjusts for both level and taper spread.



Spread to a constant-depth FAST with a Buckeye SPREADER

Buckeye Spreaders save you both time and material waste. Because the feeder roll rotates in exact ratio to the spreader wheels, you can go at any speed and maintain an accurate depth or volume of spread for every foot of travel. Typical application is shown above. The Spreader averaged about a mile a day in resurfacing a St. Louis county highway in Missouri. The job consisted of spreading a first course of ¾" penetration limestone, followed by asphalt, with a final course of pea gravel. Buckeye Spreaders, conventionally used in hook-ups with dump trucks, may be also used for special jobs with road graders and similar equipment as shown above, left. Write for the Buckeye Spreader Bulletin for complete information.

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Division of Car Wood Industries, Inc.

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Muller concrete buggies are equipped with pneumatic-tire wheels, as shown, and have a 6½-cubic-foot capacity.

Two-Wheel Buggies For Concrete Jobs

A two-wheel buggy for moving and placing concrete has been added to the line of concrete-handling equipment made by the Muller Machinery Co., Inc., Metuchen, N. J. Made of No. 14-gage steel, the buggies are welded throughout and are heavily reinforced at the corners.

The Muller buggy comes only in one size, 6½ cubic feet. Standard equipment includes 18 x 4.00 pneumatic-tires. The wheels are equipped with Timken roller bearings. The sides of the buggy are tapered so as to nest one inside the other, thus reducing boxing cubage for shipping and minimizing the storage space required.

In addition to the buggies, Muller makes floor hoppers, concrete bins, mortar boxes, and small concrete mixers.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 3.

Many Uses for New Tool

A tool described as a jack-of-all trades is featured in a bulletin released by Templeton, Kenly & Co., 1020 So. Central Ave., Chicago 44, Ill. Bulletin P & P46 states that this Simplex Util-A-Tool pulls, pushes, spreads, bends, clamps, lifts; it also pulls pinions, bushings, and plain or spoked wheels and gears.

The bulletin illustrates the Util-A-Tool in use in most of these operations and suggests other uses for it. It is said to straighten frames, push and pull machinery, clamp parts together for welding or assembly, lift and support tractors and other machinery, and perform many similar jobs.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 71.

Wet Dirt Plagues Job Of Grading at Airport

(*Continued from preceding page*)

Rock Work—Drainage

Rock excavation was handled by M. Lindberg & Son of Ishpeming, Mich., under a subcontract. Where rock was encountered it followed no real set pattern as to ledges. It had to be drilled by Ingersoll-Rand Jackhamers, loaded with 40 per cent Hercules gelatin dynamite, and broken wherever it cropped up. It was impossible to drill and shoot in any set pattern, and owing to the spotty nature of the rock work it was overshot rather than undershot.

Excavation for concrete-pipe underdrains was handled by a Barber-Greene trencher in all material but solid rock. This machine accounted for ditch excavation up to 6 feet deep at the rate of 200 linear feet an hour. Where rock was found, a Bucyrus-Erie 10B drag shovel was used with good results, accounting for 55 to 65 feet an hour. Rock formations were drilled on 3-foot centers and loosened with ½ pound of 40 per cent gelatin to the cubic yard of stone.

Personnel

The grading and handling of this earth work, one of the hardest earth-moving jobs ever done in recent years in the state of Iowa, was directed by Edwin McVaugh and George H. Haynes of McVaugh-Haynes Co. P. L. Paine was the Excavation Superintendent for the contractor.

The Civil Aeronautics Administration was represented on the job by Myron Price, Resident Engineer. Harry Bender is Superintendent of the Plant and Structures Branch of the CAA, with headquarters at Kansas City, Mo.

Le Roi Adds N. Y. Dealers

The appointment of new dealers in the New York area has been announced by the Le Roi Co., Milwaukee. One new dealer, George Malvese & Co., Jericho Turnpike, New Hyde Park, Long Island, will be the distributor of Le Roi products for the New York counties of Kings, New York, Richmond, Bronx, Nassau, Queens, and Suffolk.

George Malvese & Co., a partnership, has been in business in this area since 1921, and will represent Le Roi for its portable Airmaster compressors and Tractair. The company's facilities include a two-story building which houses a display room, as well as a service shop, parts department, offices, and warehouse. The company handles a complete line of construction machinery.

The other dealer, E. Carl Price, 18 Little Britain Road, Newburgh, N. Y., will be exclusive distributor in the counties of Orange, Rockland, Sullivan, and Ulster. The Price firm has been doing business in the Newburgh area for the past thirteen years, and will handle the entire Le Roi line. Facilities include three adjoining buildings which house a display room, offices, service and parts departments, and warehouses.

MEMO
TO ALL CONSTRUCTION SUPTS.:—
Are all buckets just "buckets"?
Shouldn't we find out if HAISS Hi-Power Reeving does mean bigger payloads?
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HAISS
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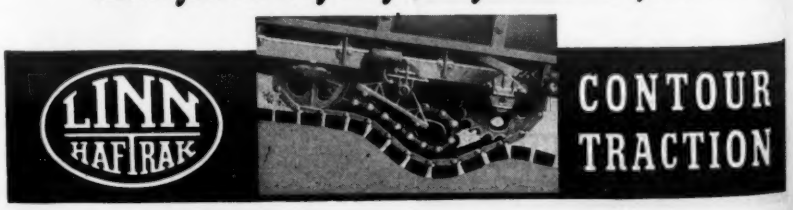
Capacities range from 5 to 50 tons, and all LINNS are adequately powered with either gas or Diesel engines. Bodies available for all types of work, or for mounting of special equipment such as shovels, cranes, oil drilling rigs, pumps or compressor units. For specifications, write to our General Sales Office, 250 W. 57th St., New York 13, N. Y.

These LINNS at work on a dam project are in so deep that you can barely see their traction units. What other type of haulage equipment could negotiate the steep, soft banks in and out of this hole... with huge payloads?

THE LINN MANUFACTURING CORPORATION MORRIS, N. Y.

Manufacturers of Haftraks for over 30 Years



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Heavy Grading Needed For New Macadam Road

Large Culvert and Much Pipe Used in Drainage; Gravel Foundation Under Stone Base Course

+ A 2.2-MILE section of State Route 67 between Bridgewater and New Milford, in the western part of Connecticut, was rebuilt last summer. The job was practically all new location in order to eliminate the sharp curves and steep grades of the old 18-foot tar-surfaced waterbound-macadam highway, first laid way back in 1914.

The new road has a 20-foot bituminous-macadam pavement flanked by 6-foot shoulders. It was built for the Connecticut State Highway Department by the General Supply Co. of Bridgeport, Conn., formerly known as Pascone Bros., at a cost of $323,997.47.

Because of its relocation, considerable grading was required; 76,552 cubic yards of earth and 51,821 cubic yards of rock were moved on this balanced-quantity earth-work job. Although only 12,573 feet long, the new road has 12,776 linear feet of drainage pipe; 3,376 feet of this item consists of concrete culvert pipe from 15 to 48 inches in diameter, and the remaining 9,400 feet is 6-inch asphalt-coated perforated corrugated-metal pipe for foundation underdrain. The macadam pavement rests on a layer of gravel varying from 6 to 24 inches in thickness, depending on the nature of the ground beneath.

Grading

Work on the grading and drainage got under way in the middle of March, 1946, and the paving was completed by late autumn. The excavation was mostly clay, hardpan, and rock, with some of the cuts in both earth and rock going as deep as 25 feet. The general practice in rock excavation was to drill holes on average 5-foot centers both ways with four Ingersoll-Rand wagon drills, each powered by an Ingersoll-Rand 315-cfm compressor. Timken bits were used, starting usually at 3 inches and decreasing by ⅛'s to 2½ inches, while the drill steel increased in 6-foot increments from 6 to 24 feet in length.

The average rock lift removed was 15 feet, with a maximum of 25 feet. The shooting usually included 50 holes at a time which were charged with American and duPont 40 per cent dynamite. After the blasts, the rock was excavated by a Lorain 2-yard and a Link-Belt 1½-yard shovel, and hauled away in trucks. The rock haul, along with the gravel haul later and some dirt-moving, was done with a fleet of as many as fifteen trucks; these included seven International 5-yard and eight Mack 6-yard units. The rock haul averaged ¼ mile.

When short hauls up to 1,000 feet were involved, the clay and hardpan were moved with tractor-scraper units. These included a Caterpillar D7 pulling a Bucyrus-Erie 8 to 11-yard scraper, and a D8 hooked to a LeTourneau 15-yard Carryall. For hauls in excess of 1,000 feet, the shovels and trucks were employed in the earth excavation and moving. The earth was spread in 1-foot and the rock in 2-foot layers by four tractor-dozers—an International TD-18 with a Bucyrus-Erie blade; a Cletrac; and two Caterpillars, a D7 and a D4. The trucks and the tractors assured good compaction to the fills.

Gravel for the sub-base was obtained from a pit about 3 miles average haul from the job. It was excavated by two Link-Belt ¾-yard shovels and hauled in ten trucks to the road, where it was dumped and spread in 6-inch layers by the dozers. The gravel was spread across the full width of the roadway to include shoulders of the same material. Final shaping was done by a Galion grader, and each layer was compacted by a Huber 10-ton 3-wheel roller. The gravel conformed to the following gradation:

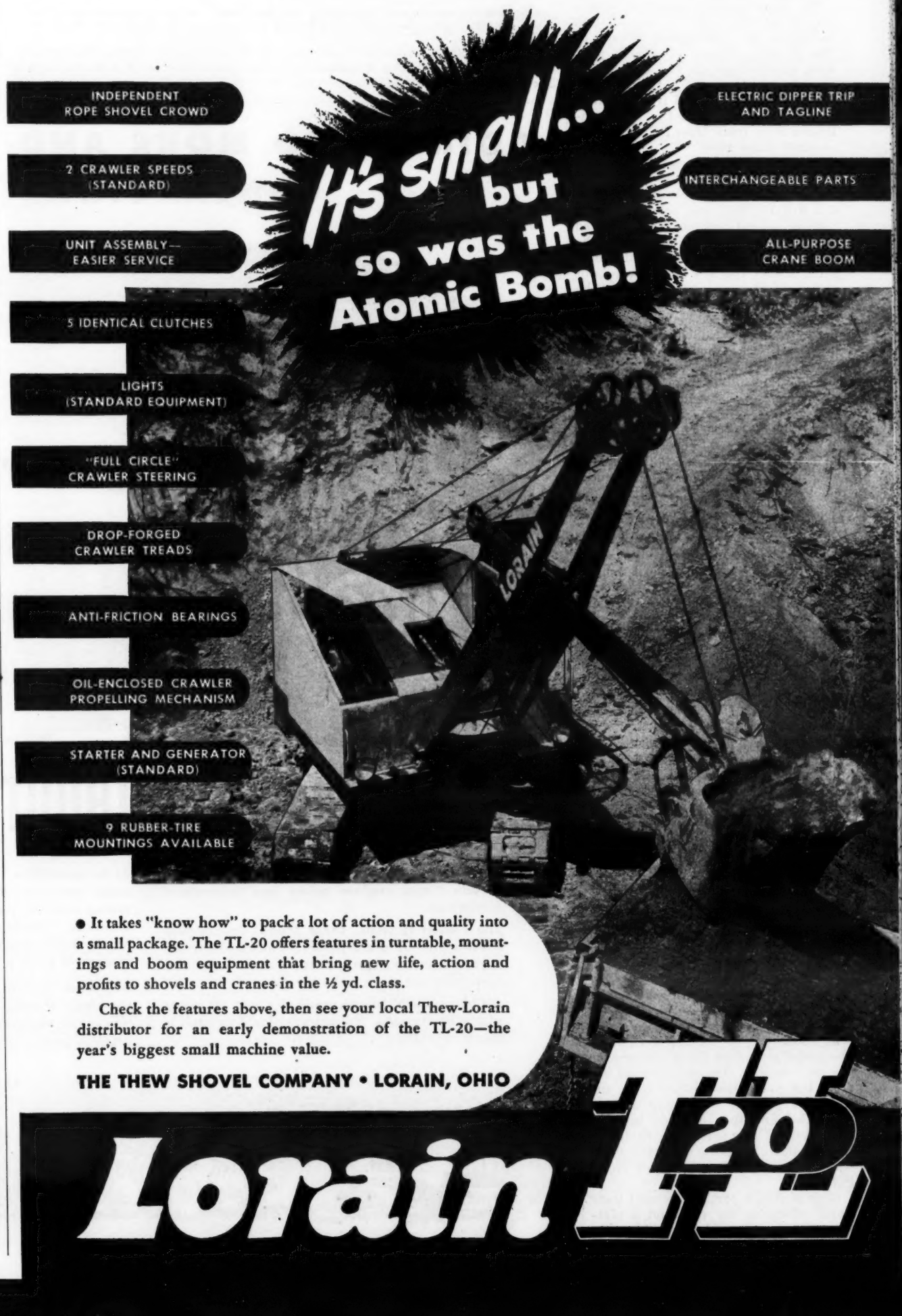
Sieve Size	Per Cent Passing
3½-inch	100
¼-inch	30-60
No. 40	5-25
No. 100	0-10

By August, enough grading was completed and gravel laid so that paving could begin. The bulk of the earth work was done during April, May, and

(*Continued on next page*)

C. & E. M. Photo

Equipment on the General Supply Co. contract was cared for in this 20 x 40-foot field shop erected near the south end of the job. Under the lean-to at the left were an A-frame and hoist for removing heavy parts for inspection and repair.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Heavy Grading Needed For New Macadam Road

(*Continued from preceding page*)

June, with an average of 2,000 yards of material moved in a 9-hour day.

Road Drainage

As is usually the case, the drainage installations proceeded concurrently with the earth work. The new location of the highway was unusually wet, being fed by many underground springs. This accounts for the large quantity of foundation underdrain that was installed, usually to a depth of 16 inches below the gravel sub-base.

The pipe trenches were dug with a pair of ¾-yard machines—a Link-Belt trench hoe and a Northwest Pullshovel. The 20-foot sections of 6-inch pipe, with perforations on the upper half, were laid by hand and bolted together. The pipe was purchased from the New England Metal Culvert Co. which delivered it by truck from Palmer, Mass., about 65 miles away.

In addition to the metal and reinforced-concrete pipe used in draining the road, a twin-box concrete culvert, 6 x 8 x 110 feet, was constructed. It replaces an old concrete bridge located about ½ mile from the north end of the project, which carried the road over a small creek. The new culvert was built about 50 feet downstream from the bridge. A new channel was dug east of the creek and an earth dam thrown up immediately below the bridge to divert the water away from the new construction.

Along the bank of this new channel a batch plant was constructed for the culvert as well as many of the headwall pours. The nearest sources of ready-mix concrete were either New Haven or Bridgeport. But since both locations were too far away for the economical employment of their facilities, the erection of a batch plant was a "must". The plant consisted of a Blaw-Knox 105-ton 3-compartment bin with beam scales. The batches were discharged into two Ransome 1½-yard truck-mixers mounted on International trucks. These mixed the concrete and delivered it to the site of the pour.

Water for the mix was obtained by building a small earth and rock dam in the creek, about 250 feet upstream from the plant, and running a 2-inch cast-iron pipe up the creek and through the dam to tap the clear water. A Carver 1½-inch centrifugal pump, operated by electricity, was set up on the bank of the creek alongside the plant to pump the water through a 2-inch hose to two tanks placed on the working platform of the batch plant.

The tanks were metal drums with a capacity of 55 gallons. But a 2-inch vertical standpipe was built in the center of each drum, supported by two metal straps welded to the sides; this acted as an overflow, permitting only 35 to 50 gallons to remain in the drum. The two standpipes passed through the bottoms of the drums and connected to a single overflow hose connection which emptied back into the creek.

Only 34 gallons of water was needed for each 1-yard batch. So when the tank was filled to this level, the water was discharged by opening a valve on the outlet pipe, thus filling the tank on the truck-mixer. The single intake line from the pump was shifted back and forth between the two drums as each was filled and then emptied into the mixer tank. This smooth-working arrangement for handling the batch water was devised by State Inspector H. D. Patterson.

Bags of Alpha portland cement were stored alongside the plant on a platform. This was made by taking six 4-foot lengths of 30-inch concrete pipe and standing them on end in a double row, and then stretching a couple of 2 x 4's over each pair of pipe sections to act as stringers. Across the stringers was laid a deck of 2 x 6's to form a 6 x 10-foot platform on which the cement bags were kept under tarpaulins until their contents were dumped into the truck-mixers.

C. & E. M. Photo

A Speedmatic electric saw was used in preparing forms for the 6 x 8 x 110-foot twin-box concrete culvert on the General Supply Co.'s contract on Connecticut Route 67.

Sand and stone for the concrete structures, as well as for the macadam pavement later, were supplied by the New Haven Traprock Co. It delivered the material in bottom-dump cars to a siding of the New Haven Railroad at New Milford, about ½ mile from the north end of the job. Here the material was unloaded by a Barber-Greene 40-foot x 24-inch belt conveyor with a capacity of a ton a minute.

Trucks hauled the concrete aggregate to the batch plant for stockpiling. There it was transferred to the bins by a Lorain crane equipped with a 45-foot boom and a ¾-yard clamshell bucket. Two sizes of stone were used, ½-inch and 1¼-inch, to fill two of the bin compartments; the other was filled with sand. The crane was also used, when the culvert walls were being poured, to lift a Blaw-Knox 1-yard concrete bucket and empty it into the forms.

(*Continued on next page, Col. 4*)

GOING INTO MORE AND MORE CONTRACTORS' EQUIPMENT

DIESEL BRAWN WITHOUT THE BULK

Every day sees more and more General Motors 2-cycle Diesel engines going into contractors' equipment.

The reason is clear. These tough, dependable Diesels provide great power in moderate space and weight. They start easily—pick up their load fast—and run more smoothly.

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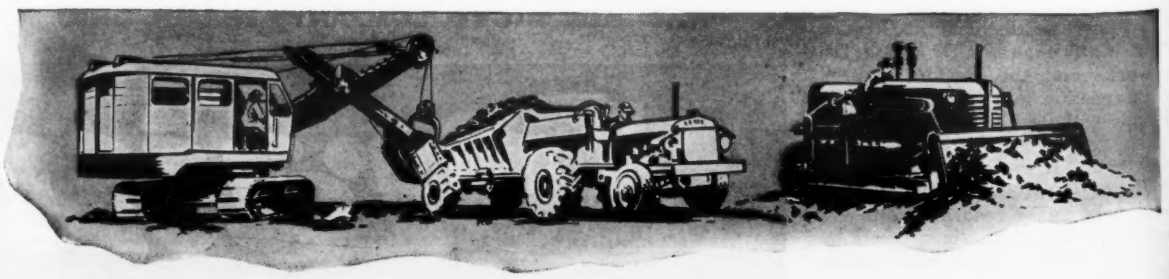
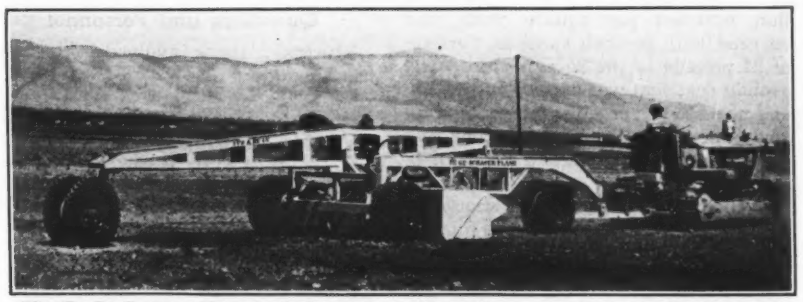


Land Leveler Used As Scraper or Planer

The first production run of the Be-Ge Scraper Plane, a new development in land-leveling equipment, was announced recently by the Be-Ge Mfg. Co., Gilroy, Calif. Designed primarily for use in the farm field, the new unit is adaptable to road-building and airport work involving the problem of leveling of large areas. The unit is a dual-purpose machine which cuts hard ground like a conventional scraper while planing the surface.

The Be-Ge Scraper Plane pivots on its two middle wheels instead of its bucket, so that, in field operation, the machine turns as accurately with the bucket empty as with it filled, using less draw-bar pull than on a straight-away, the manufacturer says. The hydraulically actuated bucket dumps accumulated trash and weeds by the movement of a control lever on the tractor. Another movement of the lever returns the bucket to its original adjusted setting.



The Be-Ge Scraper Plane is designed for land leveling on airport or road jobs, such as the preparation of seedbeds and similar work requiring the leveling of large areas.

The Be-Ge rolls on rubber-tired dual wheels, of which all but the front track behind and within the bucket path. A differential leverage action compensates for the rise and fall of the ground. The ratio of vertical travel of the blade is 1 to 6 of the front wheels.

Slightly over 50 feet long in operating position, the Be-Ge is handled by the tractor operator. The prime mover may be either a light truck or tractor. For transporting, the Scraper Plane can be telescoped to 30 feet and pulled along at standard truck speeds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 4.

Recent inspections of the Federal-Aid highway system show that 27,000 miles, or 14 per cent, is in urgent need of resurfacing or relocation to remove hazardous conditions.

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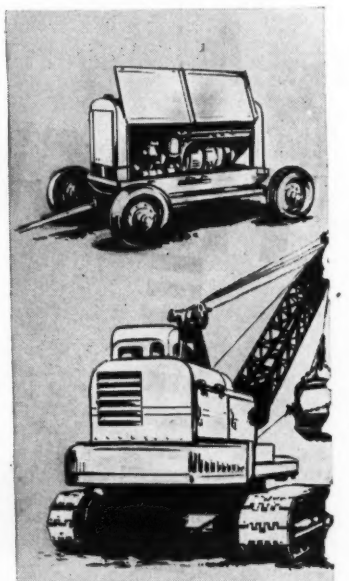

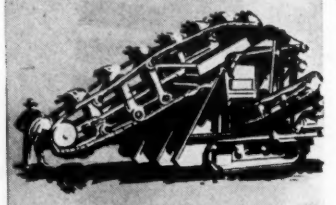

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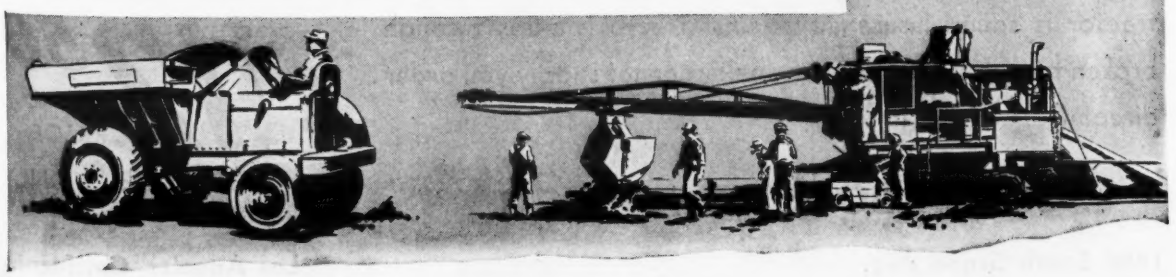

Heavy Grading Needed For New Macadam Road

(*Continued from preceding page*)

The culvert has a 14-inch floor with 12-inch walls and roof. Forms were built of 1 x 6 stock backed by 2 x 4 studs on 16-inch centers, with 4 x 4 wales also on 16-inch centers. Tie bolts were placed on an average of 4-foot centers both ways. Through the length of the culvert two 2 x 6's were used as inside cross bracing every 6 feet.

The scarcity of carpenters (only three could be secured for this job) was relieved somewhat by using a Speedmatic electric saw with an 8-inch blade for cutting form lumber. Power for the saw and the electric pump at the batch plant was obtained by tapping a near-by pole line and reducing the voltage through a transformer to the required 110 to 120 volts. When pouring the culvert floor, the contractor kept the excavation dry by using two 4-inch pumps, a Novo and a Jaeger, and two 3-inch Novo pumps.

Equipment Maintenance

The equipment used on this contract was serviced and maintained in a 20 x 40-foot shop located near the south end of the job. Built with a wooden frame and beaverboard sides and roof, the shop was entered through two 12-foot doors in the front. Inside was a wooden workbench, 15 feet long x 3 feet wide. On this were mounted a ball-bearing bench grinder, a Craftsman drill press, and a Champion spark-plug cleaner, together with a couple of bench vises.

The shop was lighted by electricity brought in from a distribution line, which was used also to operate a Brunner air compressor driven by a Westinghouse motor. Spare equipment parts were hung up on the rear wall above a Sears-Roebuck 6-inch x 2-foot lathe, and a Willard battery charger.

On the north side of the shop the roof extended to form a lean-to under which engines and other heavy parts were lifted from equipment by means of an A-frame and a Yale & Towne Duplex 1-ton hoist. Welding was done either here at the shop on a Westinghouse 300-amp portable electric welder, or out on the job by another Westinghouse welder, a 400-amp electric unit mounted on an FWD truck along with an oxyacetylene set.

Across from the shop was a 12 x 15-foot shed where Socony Vacuum oil and greases were stored, along with Lincoln and Alemite grease guns, for lubricating the equipment. Buried in the yard were two tanks containing Mobilgas diesel fuel and gasoline which was pumped each morning into the fuel tanks of the trucks and tractors. Throughout the work day, additional fuel was brought to the equipment in tanks mounted on an International truck, which was also fitted out with a portable grease unit. Drinking water was dispensed from Dobbins 5-gallon containers.

Macadam Pavement

On top of the gravel sub-base two layers of broken stone were laid to a width of 21 feet and to a total depth, when compacted, of 6 inches. Trucks hauled the stone from the siding at New Milford and dumped it into a Jaeger adjustable spreader which laid the stone to a loose depth of 4 inches. It was then compacted to 3 inches by the Huber 10-ton 3-wheel roller.

Each layer of stone was bound with sand thrown on by a whirling spreader hooked to the rear of the trucks. The sand was flushed into the interstices of the stone with water carried in a 1,000-gallon tank truck and applied through a 2-inch spray bar, 10 feet long, fitted

(*Concluded on next page*)

C. & E. M. Photo
Drinking water on a road job in the western section of Connecticut was dispensed by Dobbins 5-gallon portable sanitary drinking fountains.

Heavy Grading Needed For New Macadam Road

(Continued from preceding page)

with ¼-inch holes. Rolling accompanied the sanding and watering operations.

The gradation of the base stone and sand used in the bonding is as follows:

Sieve Size	Per Cent Passing Stone
2½-inch	100
2-inch	90-100
1½-inch	30-55
1¼-inch	0-15
1-inch	0-5

Sieve Size	Per Cent Passing Sand
⅜-inch	100
No. 4	95-100
No. 50	10-25
No. 100	0-5

The stone base course was then swept clean of all loose sand. Next, a layer of top stone, of the same size as the base stone, however, was spread in the same manner and rolled to a compacted depth of 2½ inches and to a width of 20 feet. The extra 6 inches of base stone on each side was placed with the intent of keeping the new pavement from raveling at the edges.

This top course of stone was then penetrated with 85 to 100-penetration asphalt applied at the rate of 1¾ gallons to the square yard and covered with ¾-inch stone spread 58 pounds to the square yard. Standard Oil Co. of New York asphalt was used and distributed in first a 9 and then an 11-foot lane so that the traffic would be held up as short a time as possible.

The bitumen was shipped in tank cars from Providence, R. I., to New Milford. There steam from a bleachery was used to heat the asphalt to around 250 degrees so that it could be pumped out by the distributor, which then heated it an additional 100 degrees. The cover stone was spread through Burch spreader boxes, broomed, and rolled by the 3-wheel 10-ton roller and also by a Galion 8½-ton tandem roller.

This top course was then given a seal coat consisting of an asphalt application of ½ to ¾ gallon of 85 to 100-penetration bitumen per square yard, and covered with ½-inch stone at the rate of 24 pounds to the square yard. The asphalt seal coat was applied full width, and the stone spread. A broom drag was pulled over the surface which was then rolled and shaped to a crown of ¼ inch to the foot.

In the cuts the slope on the shoulders is ¾ inch to the foot, and in the fills the shoulder slope is ½ inch to the foot. The gravel shoulders are surface-treated with tar. When the fills are under 3 feet in height, the side slopes are 4 to 1; and over 3 feet the slopes are 1½ to 1. All cut slopes are 2 to 1. At the top of the cuts the slopes are rolled back on a 5-foot curve to prevent erosion.

The gradation of the two kinds of cover stone is as follows:

Sieve Size	Per Cent Passing ¾-Inch Stone	½-Inch Stone
1-inch	100	....
¾-inch	90-100	....
½-inch	10-40	100
⅜-inch	....	30-60
No. 4	0-20	0-15
No. 8	0-5	0-5

Quantities and Personnel

The major items involved in the contract include:

Earth excavation	76,552 cu. yds.
Rock excavation	51,821 cu. yds.
Sub-base gravel	22,000 cu. yds.
Reinforced-concrete culvert pipe, 15 to 48-inch	3,376 lin. ft.
Perforated metal pipe underdrain, 6-inch	9,400 lin. ft.
Concrete for structures	435 cu.yds.
Base-course stone	13,777 tons
Surface-course stone	5,665 tons
Bituminous material	90,456 gals.

An average force of about 40 men was employed by the General Supply Co., with R. F. Murphy as Superintendent. For the Connecticut State Highway Department H. D. Patterson was Inspector, assisted by J. L. Bennitt. The job was located in the residency of F. W. Disbrow, Resident Engineer. The Department is headed by William J. Cox, Commissioner, with Arthur W. Bushell, Deputy Commissioner and Chief Engineer. Leslie G. Sumner is Director of Engineering and Construction.

Buy U. S. Savings Bonds regularly.

Rotary V-Type Plow Throws Snow Off Road

A rotary snow plow designed to throw snow over and off the road is described in a bulletin available from The Rotary Snow Plow Co., 1611 Central Ave., Minneapolis 13, Minn. The plow has reversible chutes which can be turned to direct the discharge to right or left, or part of it in each direction.

The bulletin describes six features claimed for the Snow King: speed, action, hydraulic control, balance, power, and cabin protection. The plow is of the V-type with forward-pitched blades which eject snow through the chutes by centrifugal force. Clearing width is 8 feet 6 inches, and the blade has replaceable cutting edges, plow point, heel skids, and adjustable shoe.

The catalog also lists the truck specifications required for mounting the Snow King.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 72.

Complete line of
gasoline, pneumatic and electric driven
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Write for information and prices
ROETH VIBRATOR COMPANY
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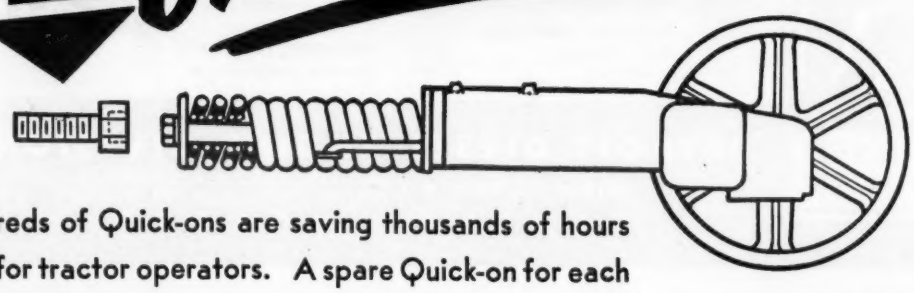
TRACK TENSION BOLTS *in* 30 MINUTES *on the Job!*



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$12.50 RETAIL PRICE
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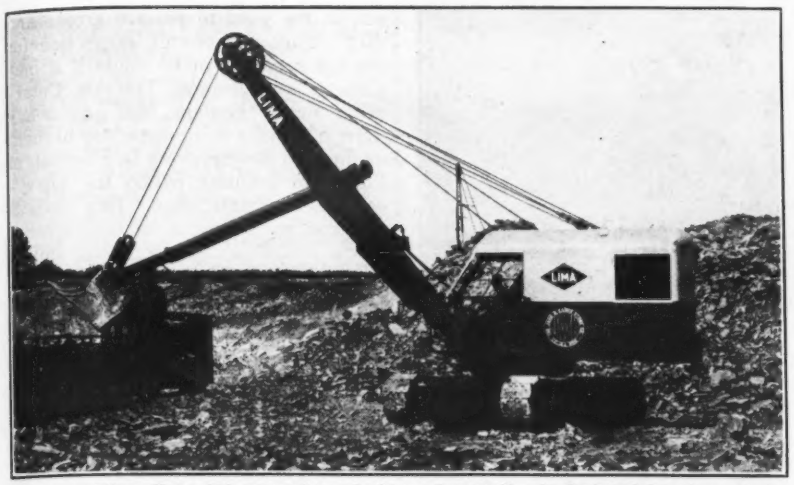


The new Lima Type 604 excavator, of 1½-yard capacity, is featured by air control.

Air-Control Feature Of New Crane Unit

A new 1½-cubic-yard shovel, crane, and dragline, known as the Type 604, has been announced by the Shovel & Crane Division of Lima Locomotive Works, Inc., Lima, Ohio. When the machine is working as a crane, it has a capacity of 30 tons at a 12-foot radius. Dragline capacities are variable, depending upon the boom length and the nature of the work. The boom is of box-type electrically welded steel construction with a wide flaring base. The dipper handle is a single unit with one-piece racking. The Type 604 is equipped with an independent chain crowd.

The crawler-truck construction is of the small dolly roller type with end-drive principle. Each belt is independently driven by a heavy sprocket chain, which is housed under the treads. All rollers are equipped with piston-ring-type seals for retaining lubricant and the protection of the bronze bushings. The truck base is a one-piece casting with center pintle, axle supports, conical roller path, and integrally cast gear case. Four conical hook rollers, equally spaced, support the rotating unit.

Steering is accomplished with the rotating unit in any position through precision air-controlled clutches. The rotating frame is of welded-steel construction. Air control is used for all major functions, including steering, swinging and propelling, hoisting, crowding and retracting, boom hoist, dipper trip, shift from swing to propel, and the swing brake. The clutches are extra large in diameter and are free from constant adjustments.

When the machine is operating as a shovel, the left-hand drum is fitted with a double sprocket and becomes a part of the crowding mechanism. The power plant consists of either a diesel engine or electric motor of approved make. When not working as a shovel, the Type 604 can easily be converted into a crane or dragline.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 5.

Resilient Joint Filler Features Non-Extrusion

In a new bulletin are listed twelve properties claimed for Flexcell, bituminous fiber expansion-joint filler. It is a product of the Flexcell Div., Celotex Corp., 120 So. LaSalle St., Chicago 3, Ill.

The Flexcell expansion joint is a premolded fiber joint of cellular nature, impregnated throughout with a durable asphaltic compound. It is made by treating Celotex cane fiber with selected asphalt.

It is claimed that even under severe conditions Flexcell will not extrude from the joint. Air pockets in the composition of the material itself are said to allow it to be compressed uniformly throughout its surface, by as much as 50 per cent under a load not to exceed 750 psi, with no extrusion.

Some of the other features claimed for Flexcell in the catalog are resiliency, durability, firm grip formed without the use of dowels or other load-transmission devices, moisture resistance, and workability.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 73.

Sperry Leaves Hercules

The retirement of Luke H. Sperry has been announced by the Hercules Powder Co., Inc., Wilmington, Del. Mr. Sperry was a member of the Board of Directors and Director of the Engineering Department. He has been succeeded in the latter capacity by Ernest S. Wilson, formerly Chief Engineer.

the FOOTE Kinetic mixer

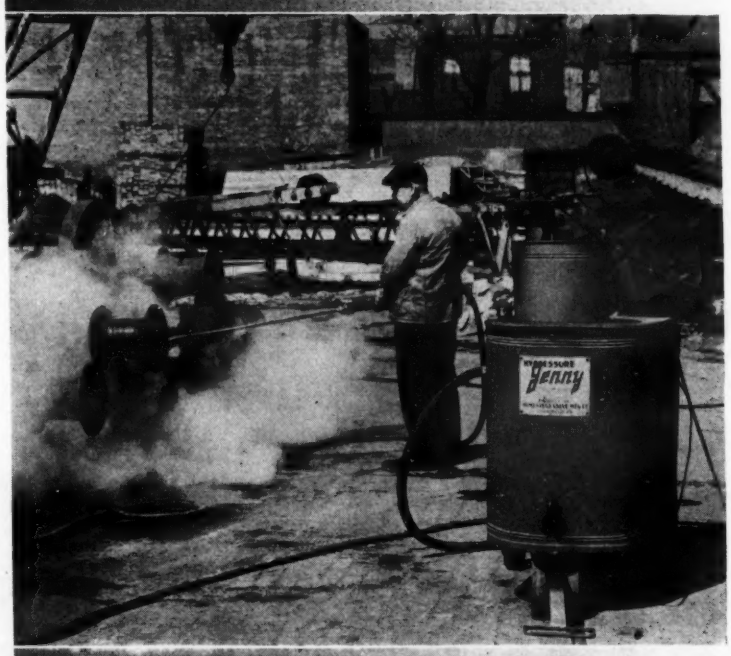
a new kind of asphalt mixer for small jobs.

3 cubic feet of any cold mix... every 30 seconds!

Send for Bulletin...and See Announcement Ad next month

THE FOOTE CO., INC.
1916 State Street • Nunda, New York

Save up to 40% on equipment Cleaning and Repair Time WITH HYPRESSURE JENNY STEAM CLEANER!



HYPRESSURE JENNY DIVISION
Homestead Valve Manufacturing Company
P. O. Box 30 • Coraopolis, Pa.

Hypressure JENNY's highly atomized mixture of steam, hot water and cleaning compound, applied under pressure through a spray-nozzle, instantly loosens and flushes away accumulated deposits of mud, dirt and grease from all types of machinery and equipment. And JENNY does it 8 to 10 times faster than by hand methods. Cleaning machinery with Hypressure JENNY *before* repairs, will save up to 40% of your mechanics' time which would otherwise be lost wiping dirt and grease from tools and equipment.

The following are typical savings JENNY is effecting: for hundreds of enthusiastic users*:

"We save $25.00 on each piece of equipment we clean with Hypressure JENNY."

"It formerly required from 6 to 10 days with 2 men using scrapers and gas brushes to clean one machine. With Hypressure JENNY one man does a better job in 4 to 6 hours."

"It used to cost us $140.00 to clean a shovel and took one week's time. Now we do a better job in 2 days at a cost of only $60.00."

Hypressure JENNY is a sturdy, compact, portable unit easily transferred from one cleaning job to another. Oil-fired or gas-fired models are optional; and the only requirements for operation are an electric current outlet and a hose connection to water supply. JENNY is economical, and so safe and easy to use that ordinary labor can operate it.

Write for illustrated folder and complete information on how Hypressure JENNY can save *you* time and money. There is no obligation.

* *Names on request.*

Contractor's Shop Main Repair Base

Excavating and Paving Equipment Overhauled in Winter by Central Shop For Summer Work

✦ "HOW to Convert a Casket Factory Into a Heavy-Equipment Repair Base" might well be the title of this article. That is precisely what Brown Construction Co. of Pueblo, Colo., has done with the red brick building and 3 acres of ground at the old Pueblo Casket Co. Located at 1530 Abriendo Street in the southern part of the city, the property has been converted into an office and repair base for units of heavy grading equipment. The machines are now working over the state of Colorado.

The building was purchased in 1943. Built of red brick, it was then 100 feet wide x 125 feet long. Now it is being enlarged with similar brick to make a modernistic office wing facing Abriendo Street. A 30 x 45-foot welding shop is under construction, with its concrete floor already placed. When this work is finished, the original building will then be used for heavy repairs in winter, and for the storage of mechanical parts that are not needed immediately on field projects.

Brown Construction Co. is one of Colorado's expanding contracting firms. It operates a fleet of heavy grading and paving equipment during the work season, which averages about 10 months. During the winter months when construction is slack, the shop gets its heaviest work.

Standardized Equipment and Parts

Brown equipment has been standardized as much as possible. The company owns fourteen Caterpillar D8 tractors, and has standardized on LeTourneau Carryalls and power-control units. It has one Caterpillar elevating grader, and recently purchased three new Lima shovels ranging from the small Paymaster to the large 2½-yard machine.

By standardizing on these makes of heavy equipment, the organization hopes to get peak performance as well as to ease the annual repair headache. The idea is already paying dividends, because so far the shop has not been held up for lack of parts.

In ordering parts, everything is anticipated about 4 months ahead of its actual need. If a machine breaks down, emergency parts are in stock to fix it up. At least one Caterpillar crankshaft, drive sprocket, and final-drive gear set are purchased and kept on hand for emergency use. The company is not hoarding parts, however. It is merely making sure that it will have the necessary items to replace whatever breaks down.

Conveyor belting for three rock crushers is purchased in 1,000-foot rolls, and spare belts cut off as needed. Spare spools of cable and other fast-moving parts are kept stored on the main floor of the storage room in the shop. Service trailers haul this material to the jobs.

There are three of these service trailers, all Whites with Cummins diesel engines. One large trailer hauls the 2½-yard Lima shovel. All three rigs are on the highway most of the time, transferring machines between jobs or bringing heavy units to the shop for repair. In the summer working season, tractors and other heavy units are very seldom if ever hauled in to Pueblo. Six mechanics who work in the Pueblo shop through the winter go out on the jobs in summer. When several projects are under way, this procedure spreads the mechanical force thin. But Brown Construction Co. manages to get away with it because its winter repairs are so thorough.

C. & E. M. Photo

The Brown Construction Co.'s general shop, 100 feet wide x 125 feet long, keeps its fleet of construction equipment in A-1 operating condition.

By late summer equipment out on the job has already been inspected by Carroll Brown and Clarence O. Brown, the two brothers who supervise the work of the company in Colorado. Master Mechanic J. L. Tezak accompanies the Browns on this trip and, on the basis of the inspection, he orders repair parts to put the machines in A-1 operating condition. Then about the first of November, the first equipment comes off the job and moves into the Pueblo shop for its winter overhaul.

Shop Procedure, Equipment

When the equipment starts to come in, a Kerrick steam cleaner is wheeled out in the yard to remove grease and dirt. A more thorough inspection for needed repairs can be made if a machine is well cleaned. Tractors, Caterpillar motor graders, and any heavy units of tractor equipment, are brought in through sliding doors to a section of the main building called the heavy-equipment repair shop. This shop is serviced by a Yale 3-ton spur-geared block, mounted on a traveling rail so that it can reach any part of the floor. This hoist is then used to pull engines, power-control take-offs, or other heavy parts off the machines.

The small power equipment in this shop has been standardized,, also. A Black & Decker Super Service valve refacer reseats engine valves and inserts. Black & Decker bench grinders are on all the three long worktables. All heavy mechanical tools are Blackhawk, which still carry the old guarantee that has built up good will through the years. Recently, when a ratchet dog broke after heavy use, the wrench was

(Concluded on next page, Col. 4)

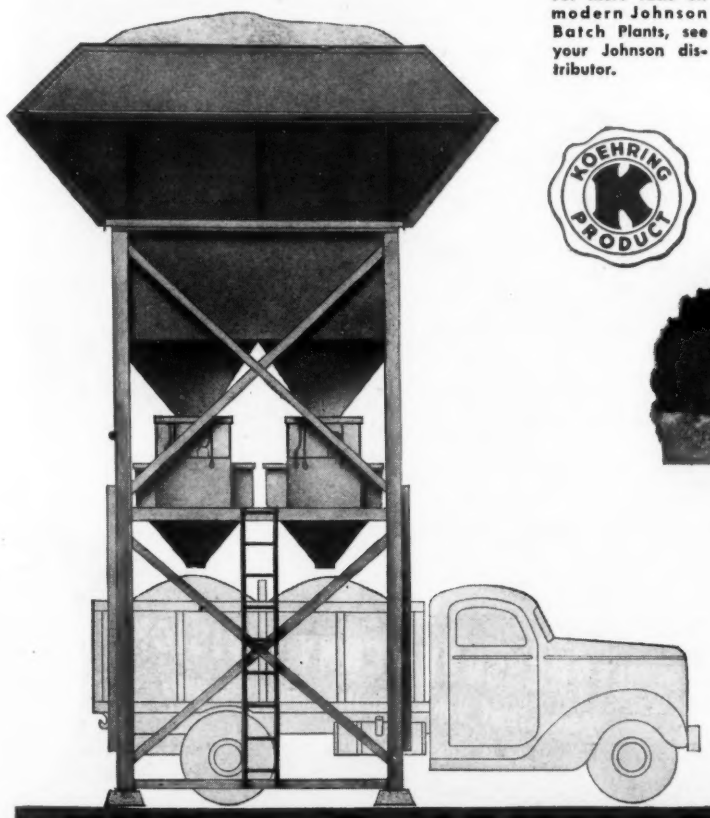
1-STOP BATCH PLANT SAVES BATCH TRUCKS

TWO FULL BATCHES Loaded in ONE OPERATION at both Aggregate and Cement Plant

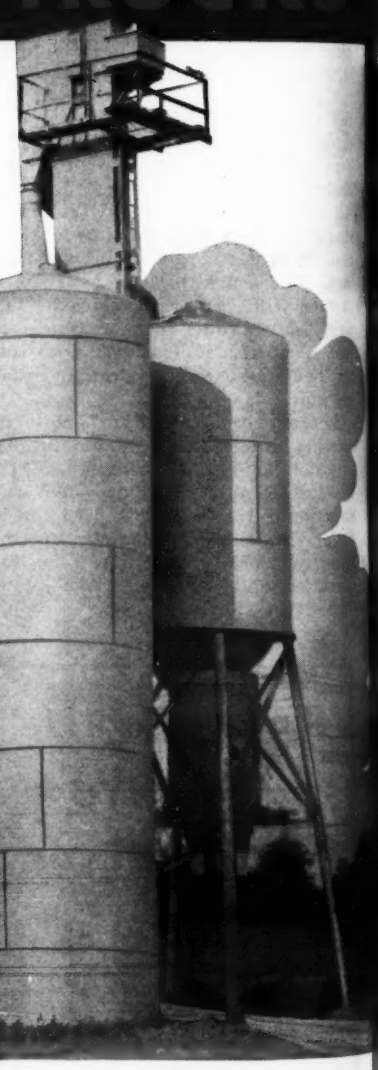
In the Johnson 1-Stop Batch Plant, extra spot stops for 2-batch trucks are eliminated. Loading time for both aggregate and bulk cement is cut in half. Trucks get away to the paver minutes faster. Minutes saved by 1-Stop loading often permit reduction in number of trucks needed to keep paver busy. No time is lost at paver waiting for batch trucks.

Johnson 1-Stop Batch Plants combine new Johnson Dual Aggregate Bin, equipped with two multiple material batchers, and a Johnson Bulk Cement plant, equipped with two cement weigh batchers. Controls of both the aggregate unit and cement unit are grouped for 1-man operation.

For more facts on modern Johnson Batch Plants, see your Johnson distributor.



KOEHRING K PRODUCT



1-STOP LOADING at bulk cement plant. Cement bin equipped with two weigh batchers. Johnson Twin Silo Bulk Cement Plant shown above stores up to 1,556 barrels of cement, yet is fully portable.

1-STOP LOADING at aggregate plant. Johnson Dual Aggregate Batch Plant, equipped with two multiple material batchers, delivers both batches of aggregate simultaneously. 3-Compartment bin, 100-yard capacity.

THE C. S. JOHNSON COMPANY

Aerial-Photo Detail Transferred to Maps

The development of a new mapping instrument has been announced by the Fairchild Camera & Instrument Co., 88-06 Van Wyck Blvd., Jamaica, Long Island, N. Y. It is designed to provide the map maker with a simple means of rectifying and transferring planimetric detail from aerial photographs to maps and charts. Based on the principle of the camera lucida, the Rectoplanigraph is said to be easy to use. It is a portable, lightweight instrument and can be set on a drafting table.

Its design provides indexed adjustments for three camera focal lengths, 6, 8¼, and 12 inches; a micrometer adjustment for all variations in scale; and other adjustments for rectification of the photographs to compensate for errors introduced by tip and tilt. A picture holder is fitted with masks to accommodate air photos ranging from 4 x 5 to 9 x 9 inches.

In operation, the map maker aligns the ground control on the aerial photograph, mounted in the picture holder, with a corresponding control on the chart lying before him under the eyepiece. When all necessary adjustments have been made, he can trace the desired supplementary detail on the map or chart by following the image of lines from the photo.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 8.

C. & E. M. Photo

One of the Brown Construction Co. welders converts an Army-surplus truck into a heavy-duty construction unit. A large steel bed was installed for hauling 10-ton loads of rock from the company's new 2½-yard Lima shovel.

Contractor's Shop Is A Main Repair Base

(Continued from preceding page)

sent off, repaired at no charge, and even the cost of transportation was reimbursed.

The shop also carries the special Caterpillar, Cummins, and International tools it needs to repair those makes of engines. These include injector sets, special tools for dismantling mechanical assemblies, and an engine-indicator set.

When the first pieces of equipment have been repaired, they are stored in the large yard outside if they do not have to return to the job. Idle equipment is then rented, or put to use as much as possible during the winter. Tractor-mounted bulldozers take small contracting work in connection with Soil Conservation Service reservoir projects. Rock crushers are rented out by the day to city and county road departments.

Brown Construction Co. has been successful in purchasing many pieces of heavy equipment from war stocks. These come from military bases in California and Oregon. Recently it had to buy some right-hand-drive trucks, included in a consignment of tractors. These trucks were assembled in the yard and checked for performance. During the current winter repair season, it is planned to build two water sprinkler tanks, with force feed, on two of these FWD's.

Personnel and Policy

The same mechanics who service the machines in summer come in to the Pueblo shop at the end of the construction season. By giving them year-round work, Brown Construction Co. retains their services and develops their capabilities as time goes by. With steady employment assured, most of these men take a genuine interest in the performance of their equipment, and actually come to feel they have a part in the business.

The company has tried to sharpen its pencil, to shave costs, and bid construction work as low as possible in order to work all its machines as much of the time as it can. All estimating and engineering for the State of Colorado is still done by Carroll and Clarence Brown, who are in a state of more or less continual automobile transit between their jobs.

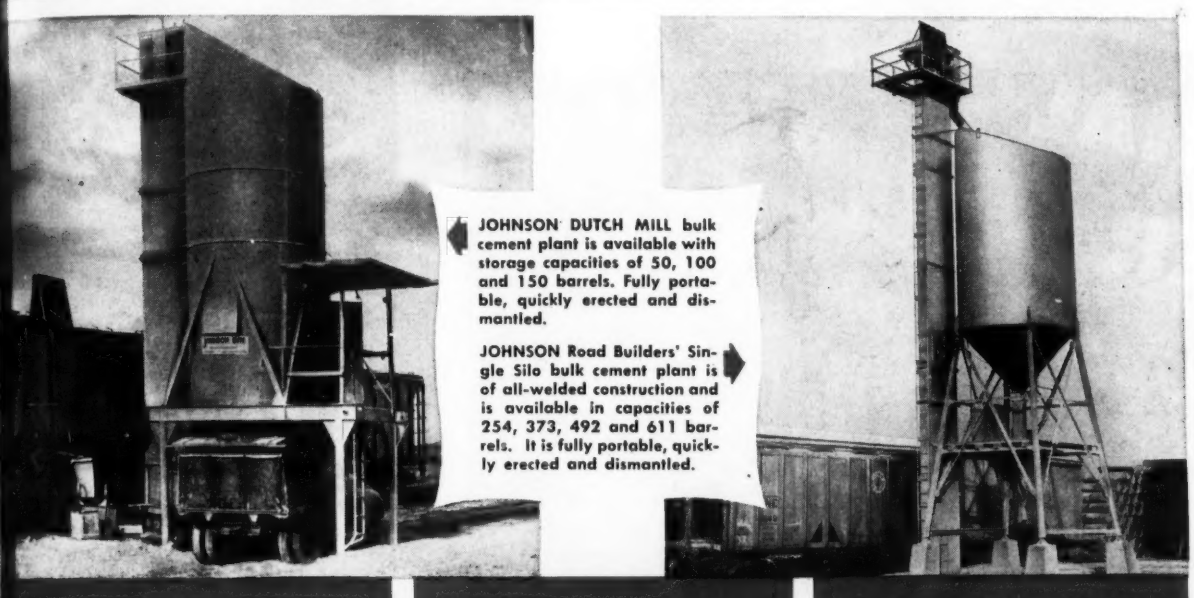
By combining their mechanical repair base with their office, and showing their mechanics by example how important good repairs are to progress and profits, Brown Construction Co. has taken a step forward in its march towards a "big contractor" classification.

Reclamation Expert Dies

George Hebard Maxwell, often described as the man who made the desert bloom, recently died at the age of 86. Mr. Maxwell was an authority in the field of reclamation, flood prevention, and erosion control. His campaigns helped to bring about the National Reclamation Act of 1902.

Under this Act, Mr. Maxwell organized the First Water Users Association in Salt River Valley, Ariz. This organization was instrumental in bringing about the construction of the Roosevelt Dam in that territory. He supported, in 1928, Government appropriations of $160,000,000 to safeguard the Mississippi River Valley from great floods.

Mr. Maxwell has written many books on the subject of reclamation and erosion control. He was the head of the National Reclamation Association, as well as a director and member of many organizations concerned with his favorite subject.



JOHNSON DUTCH MILL bulk cement plant is available with storage capacities of 50, 100 and 150 barrels. Fully portable, quickly erected and dismantled.

JOHNSON Road Builders' Single Silo bulk cement plant is of all-welded construction and is available in capacities of 254, 373, 492 and 611 barrels. It is fully portable, quickly erected and dismantled.

PARSONS 250 TRENCHLINER*

Straight, Clean Trenches for Sewers, Pipe, Water Mains

Parsons 250 Trenchliner, product of more than 40 years of trencher building experience, incorporates all the desirable features that make money for you on trenching jobs. Telescoping boom for easy depth adjustment. Shifts from side to side across full Trenchliner width. Centralized 1-man controls.

*Reg. Trademark

PARSONS CO.
NEWTON, IOWA

KWIK-MIX DANDIE CONCRETE MIXER

Tilted Flow-Line Discharge Chute Empties Drum Seconds Faster

Tilted Flow-Line Discharge Chute, exclusive on the Kwik-Mix Dandie line of concrete mixers, reaches deeper into the drum, intercepts tumbling concrete at just the right angle to maintain natural flow-line in discharge. Kwik-Mix Dandie mixers are available in the following sizes: 3½-S, 6-S, 11-S, 16-S.

KWIK-MIX CO.
PORT WASHINGTON, WIS.

KOEHRING 605 CLAMSHELL

High Lifting Capacity For Extra Tonnage

High lifting capacity of the Koehring 605 in clamshell work pays off on every cycle — 960 times each 8-hour shift. Swing is fast and smooth. Travel is simplified, easy on the operator, because it's never necessary to move the turntable into a precise travel position. Koehring 605 is ready for travel with turntable in any position.

KOEHRING CO.
MILWAUKEE 10, WIS.

Crane Undercarriage Has Pneumatic Tires

A crane undercarriage with 12 pneumatic tires is available from Six Wheels, Inc., 1572 E. 20th St., Los Angeles 11, Calif. These carriages are built for all makes of cranes from 5 to 40-ton capacity. They may be secured as new original mountings, or for modernizing and speeding up crawler-type cranes now in use.

The Maxi carriages have the same speeds in either direction and are available with 2 or 4-speed transmissions. All steering, braking, and gear shifting are controlled by the crane operator from the cab, regardless of the position of the cab on the carriage. The brakes are 6-wheel air-operated. Speeds up to 10 mph can be obtained.

The front and rear axles are of the oscillating type to eliminate boom sway and bounce while traveling. According to the manufacturer, they keep the frame and roller path level, with any or all wheels sitting at various levels.

This Link-Belt Speeder crane has a Maxi CC-20 pneumatic-tired undercarriage made by Six Wheels, Inc.

The method of drive is from reversible traveling clutches in the crane upper structure, through a Maxi patented vertical propel shaft through heavy-duty miter gears, through the transmission to a single-reduction bevel-gear jackshaft differential assembly, which drives dual chains, one to each rear wheel, to assure positive traction under adverse conditions.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 7.

Double-Trussed Conveyors

Portable conveyors for use in handling sand, calcium chloride, gravel, and similar materials, are described in a bulletin issued by the Portable Elevator Mfg. Co., Bloomington, Ill. A feature of this line is the double-trussing method of construction. The Little Giant line is trussed continuously, section by section, and joint by joint, from top to bottom, according to the company.

The bulletin gives detailed information on the construction and performance features of these elevators, including their special bearings, high-carbon steel flights, and free travel from feeder to main elevator. It describes in full the methods of powering and the method of joint construction and section addition.

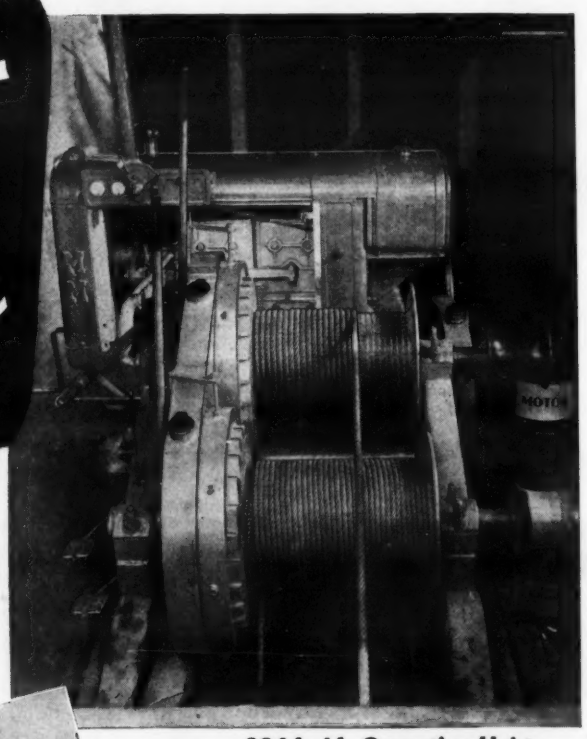
The Portable Elevator Mfg. Co. also makes a line of overhead lifting jacks and speed jacks.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 35.

INDUSTRIAL POWER with your

MINNEAPOLIS-MOLINE MM MODERN MACHINERY

Adaptable to Many Needs

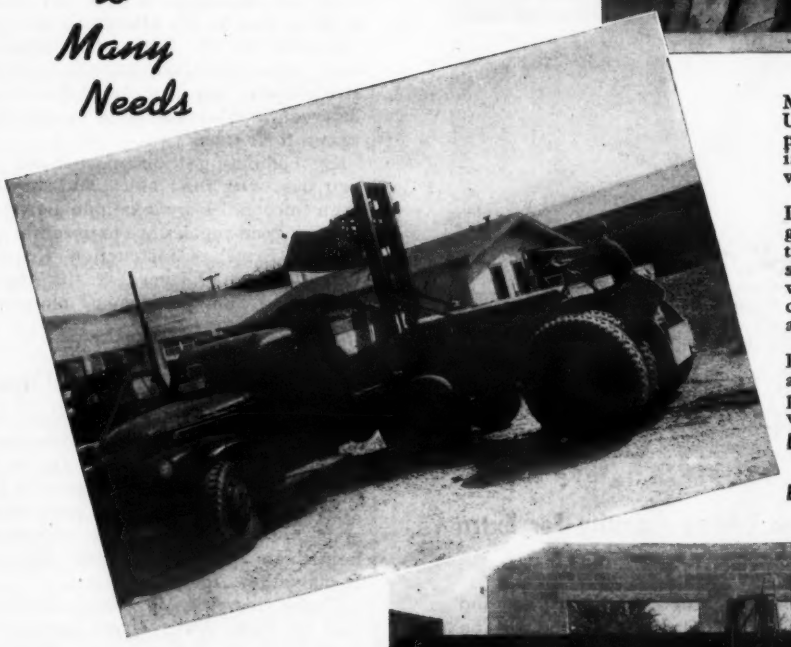


206A-4A Operating Hoist

MM Modern Industrial Tractors and Power Units provide economical and dependable power for handling materials and performing with ease a large variety of jobs in highway and building construction.

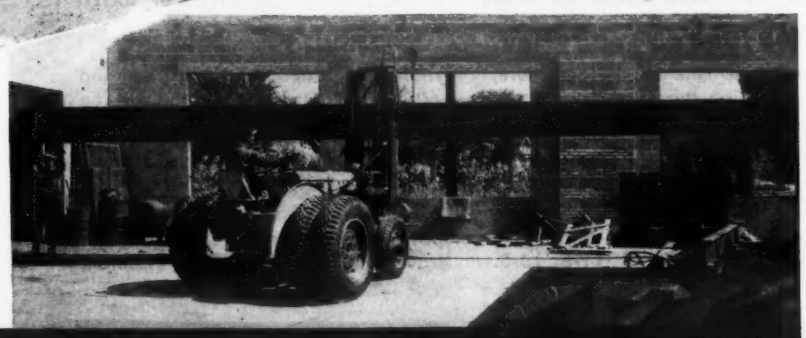
Balanced weight and power of MM Industrial Tractors, their heavy duty steering gear, front axle, and tire equipment, and their fine range of forward speeds and high speed reverse gear make them ideal for use with various attachments such as loaders, cranes, hoists, and material buckets, as well as for heavy drawbar work.

MM Power Units in seven sizes from 20 H.P. to 206 H.P. provide steady, dependable power ideal for operating generators, pumps, conveyors, compressors, hoists, winches, and cranes.



Left: MM RTI Industrial Tractor With Front End Loader Using Shovel

Below: MM Industrial Tractor With Front End Loader Using Forks



See your nearest MM Dealer —Distributor, or write for facts.

MINNEAPOLIS-MOLINE POWER IMPLEMENT COMPANY
MINNEAPOLIS 1, MINNESOTA, U. S. A.

SO SMOOTH... SO STEADY... This arc almost maintains itself!

Improved Performance Results From NEW EXTRUSION COATING on STOODY SELF-HARDENING*

*For hard-facing all heavy equipment.

There's no sputter, no slag interference when you burn the new EXTRUSION COATED STOODY SELF-HARDENING! This new, improved coating simplifies application, speeds up rate of deposition and eases welders' problems.

- Slag is self-lifting as deposits cool.
- Either AC or DC machines can be used.
- Welding amperage isn't fussy.
- Rods are completely uniform.
- Moisture absorption is licked.

With all its improved weldability, the new Extrusion Coated Stoody Self-Hardening retains its former advantages: Same hardness, same wear resistance even on multiple layers, bonds to manganese as well as other steels, provides maximum impact and wear resistance.

Order 50 lbs. of the new COATED STOODY SELF-HARDENING TODAY! Keep your earth-working equipment in top operating condition! Available in 3/16", 1/4", 5/32" and 1/8" rod diameters. NO CHANGE IN PRICE!

FREE STOODY GUIDE BOOK shows 125 proven hard-facing applications.

STOODY COMPANY
1136 W. SLAUSON AVE., WHITTIER, CALIF.

STOODY HARD-FACING ALLOYS
Retard Wear Save Repair

Give

USO

It still means a lot to them

C. & E. M. Photo
Here is one of the prime movers on the McLean 6½-mile grading job, a LeTourneau 14-yard scraper with a Caterpillar D8 tractor.

Unusual Methods Move Light Sand

Scrapers Substitute for Shovel and Trucks in Rock; Base Course Placed With Back of Dozer Blade

(*Photo on page 1*)

✦ SAND so fine and clean that it passes State Highway Department tests for masonry concrete is not the easiest material with which to work on grading operations. McLean Construction Co. of St. Paul, Minn., highway contractor, resorted to unusual methods to handle it. Also, praise was due the wet summer which made scraper loading easier on the 323,000-cubic-yard contract for relocating and reconstructing State Trunk Highway No. 35 for 6½ miles north from Hudson, Wis.

Orthodox methods distinctly were not the order of the day on this job. In one sidehill rock cut, 43 feet deep and 600 feet long, sand-rock and shale were removed by scraper after scarifying, because the light sand would not permit truck and shovel work. At another point, when no other equipment could get out on the sand, some salvaged topsoil was dragged back on the fill with the back of a dozer blade.

The State Highway Commission of Wisconsin awarded a contract for the work to McLean Construction Co. last April on its bid of $158,258. The contract called for widening the old gravel and bituminous-surfaced highway from a 24-foot shoulder-to-shoulder width to a 41-foot new grade, and straightening the road. Approximately two-thirds of the project was new construction, providing a new grade for the scenic highway along the banks of the St. Croix River.

Clearing and Grubbing

Frank Foley of Luck, Wis., Construction Superintendent for the contractor, moved in on the job last spring with his grading equipment. Initial operations involved a fair amount of clearing and grubbing. For approximately 120 stations, removal of growth ran to timber 2 and 3 feet in diameter. Speedy and efficient removal of this fairly heavy timber was a matter of course for two new Mall power chain saws. Stumps and roots were dozed out with two Caterpillar D8 and a Caterpillar D4 dozers. Or they were snaked out by chain attached to the dozers or one of the scraper units.

Five LeTourneau 14-yard scrapers with Caterpillar D8's, and one 20-yard LeTourneau with a Caterpillar D8 tractor, removed the topsoil from the section over two-thirds of the contract where new grade was involved; they also removed the wearing course of gravel and bituminous surfacing from the balance of the highway. The topsoil totaled 90,000 square yards. It was pushed back from the grade section by the D8's and dozers, to be salvaged later for a top dressing on the slopes to obtain vegetation cover on the sand fill. Then the scrapers went to work in earnest, handling the 323,000 cubic yards of light sand excavation and fill.

For 36 stations from the edge of the city of Hudson north, where the subgrade was a clay loam of fairly stable properties, the scrapers excavated 2 feet; and no base course of sand-gravel was required. On the rest of the construction over the old highway, scrapers excavated for 1½ feet, and the grade was given a stabilized base of sand and gravel for this depth.

New Fills

Over two-thirds of the distance of the contract, however, the highway was relocated with new fill sections. The job was almost entirely balanced cut and fill sections. With shrinkage estimated at 20 per cent, the job "came out on the nose", according to John Curnow, Eau Claire, Resident Engineer for the State Highway Commission of Wisconsin.

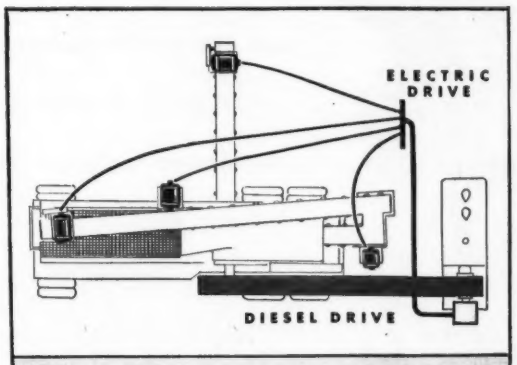
Average hauls on the job ran between 600 and 700 feet, well suited to tractor and scraper output. Although one borrow area involved a haul of almost a mile, production did not greatly suffer. The contractor managed a daily average of about 10,000 cubic yards with his six dirt-moving outfits.

C. & E. M. Photo
Work on the 323,000-cubic-yard Wisconsin grading job was under the supervision of John Curnow, left, Resident Engineer for the State Highway Commission, and Frank Foley, Superintendent for McLean Construction Co.

But when Superintendent Frank Foley encountered the 43-foot deep

(*Concluded on next page*)

NEW
CRUSHING AND SCREENING PLANT



WITH DIESEL AND ELECTRIC DRIVES

● Here's a high capacity plant that is more portable and requires less set-up time than other big plants.

One 125 HP continuous duty diesel unit powers the entire plant. A flat belt direct from the diesel unit drives the jaw crusher which powers the roll crusher through V-belts.

A 50 KVA generator mounted on the diesel unit furnishes electricity for the motors on the heavy duty screen and on each conveyor.

The screen is 3½ deck with bottom deck feed and top deck return. There are 96 square feet of specification screen for producing finished material. Stone chips can be produced as a by-product without extra equipment.

CONDENSED SPECIFICATIONS:

Jaw Crusher—10″ x 36″
Roll Crusher—40″ x 22″
Vibrator Screen—4′ x 12′, 3½ deck
Feeder Conveyor—30″ x 50′
Delivery Conveyor—30″ x 50′
Moving height—12′ 6″
Width—8′
Moving weight (main unit)—64,500 lbs.

Write for complete information about this big plant . . . built with extra margins of performance for extra profits.

● Generator mounted on diesel unit provides power for screen and conveyors through control panel. Crushers are driven by belt direct from diesel unit.

● A 46-VE on the job in Colorado. Pioneer Hydraulic Conveyor Trucks and the single diesel unit make it extremely portable unit.

PIONEER ENGINEERING WORKS
1515 CENTRAL AVENUE • MINNEAPOLIS 13, MINNESOTA

Engineers and Manufacturers of Quarry—Gravel Bituminous and Mining Machinery

PLAN WITH **Pioneer** ENGINEERING WORKS

C. & E. M. Photo
An Austin-Western 90 motor grader shapes the new grade near the city of Hudson, Wis. There the subgrade was a stable material of clay loam.

Unusual Methods Used In Moving Light Sand

(Continued from preceding page)

sidehill rock cut of sand-rock and shale, he scratched his head and said, "No truck will get in or out of here on this sandy fill. We'll have to take this stuff out by scraper".

So into the cut went a Caterpillar D8 with a LeTourneau Rooter, ripping into the soft rock formation. And out in lifts of from 8 to 10 inches came the rock to form the fill for the new highway grade.

Rain Helped

The summer was a fairly wet one, and the moisture in the sand assisted loading operations. Using two Caterpillar D8's as pushers, the scrapers loaded to overflowing capacity. When the sand was dry, however, it was next to impossible to get a good load.

The characteristics of the sand were clearly recalled by Resident Engineer Curnow who, some years ago, worked on the interstate bridge between Wisconsin and Stillwater, Minn., just a few miles north of the job. At that time he submitted samples of the same sand which provided the fill to the Minnesota Department of Highways. Not only did it pass tests for masonry concrete, but one or two of his fellow engineers suggested that the samples were so clean he might possibly have obtained them from a commercial producer.

Shaping and Shouldering

As the new grade was built up, the roadway and the shoulders were shaped with two Austin-Western 90 motor graders and one Caterpillar No. 12 motor grader. The new highway has a shoulder-to-shoulder width of 40 feet; 4 to 1 shoulder slopes; ditches 2½ feet deep with 10-foot bottoms; and backslopes varying from 2 to 1 to 4 to 1. A temporary gravel wearing course was laid over a 20-foot spread.

Some 30,000 cubic yards of sand-gravel fill was brought in by scraper for base over the sand. Over this, the salvaged topsoil material which had been dozed out to the sides was brought back on the grade by the back of the dozer blade. The gravel wearing course was produced and laid by Herbert Turner & Son of Boscabel, Wis., operating from a pit near the north end of the job. The highway is designed for future surfacing with a 2-inch bituminous mat.

Personnel

During most of the summer, the contractor employed 25 men working two 8-hour shifts 6 days a week. As work neared completion, he reduced his payroll by about one-half and worked one 10-hour shift 6 days each week. Approximately five months were required for completion of the work.

While operations were in full swing, a field repair shop was set up on the job with such repair facilities as electric drills, a Lincoln welder, and small tools. The operators lubricated their own machines each shift with Alemite guns.

New Bench Grinder Has Safety Features

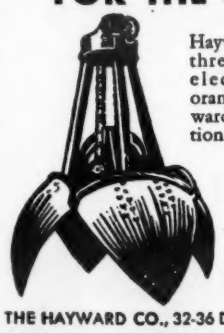
A new 6-inch heavy-duty bench grinder has been designed and styled for service in grinding, tool sharpening, wire brushing, and buffing by The Black & Decker Mfg. Co., 787 E. Pennsylvania Ave., Towson 4, Md. Strong steel wheel guards and covers give extra protection and meet all safety requirements, the manufacturer says. Also, they are wide enough to accommodate a standard 3-section wire wheel brush without any change in the guard.

Fitting around the grinding wheel for improved support in tool sharpening are adjustable U-shaped tool rests. The 2-pole push-button switch is recessed in the housing to prevent accidental contact. On the face of the grinder base a machined hole is provided for mounting attachments commonly used on bench grinders.

The grinder can be bolted to a bench or mounted on a new streamlined pedestal that can be spotted anywhere in a shop. Standard equipment includes two grinding wheels; medium-grade for rough fast work, fine-grade for finish grinding and tool sharpening.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 9.

USE RIGHT BUCKET FOR THE JOB



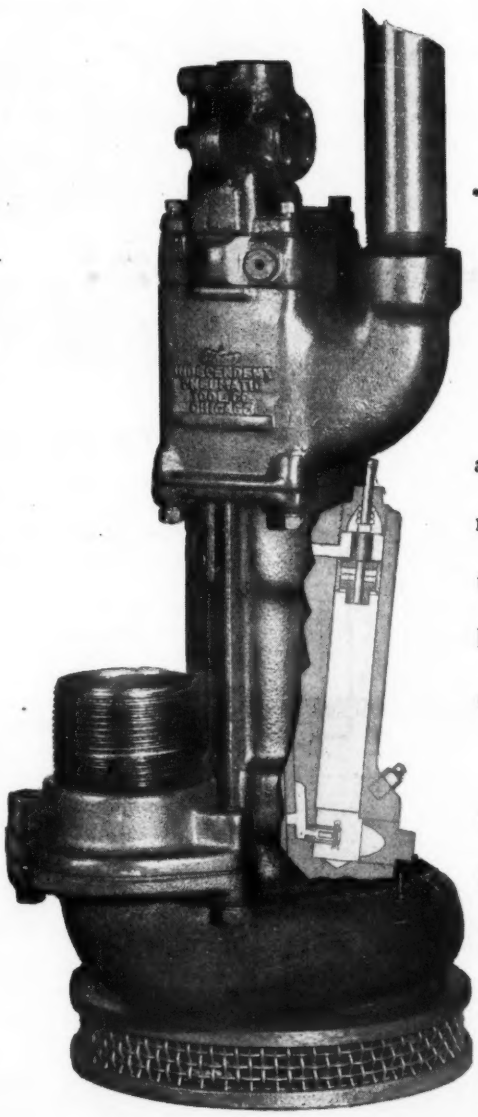
Hayward makes all three—clamshell, electric motor, orange peel. A Hayward recommendation is unbiased.

THE HAYWARD CO., 32-36 Dey St., New York

Hayward Buckets

Thor SUMP PUMPS

Keep Pumping!



. . . Improved Lubrication Assures Peak Efficiency

In Sump Pumps, the *impeller shaft bearings* are the most vulnerable parts, with premature failure causing undue job delay and expense. Thor safeguards these vital points by a large grease reserve that is force-fed under continuous air pressure—pressure that further prevents foreign matter from working into the bearings. Because of this *exclusive feature*, Thor Pumps can be operated continuously up to a full shift without regreasing.

Thor Sump Pumps are designed to operate efficiently in clean or dirty water; in oil, sludge or sewage—either partially or fully submerged. Your nearby Thor Distributor will gladly demonstrate them as the economical answers to your sump-water problems.

INDEPENDENT PNEUMATIC TOOL COMPANY
600 W. Jackson Blvd., Chicago 6, Illinois

Birmingham Boston Buffalo Cincinnati Cleveland Denver Detroit
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St. Louis St. Paul Salt Lake City San Francisco Toronto, Canada London, England

Thor PORTABLE POWER TOOLS

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

REGISTRATIONS *SHOW* IT—
OPERATORS *KNOW* IT!

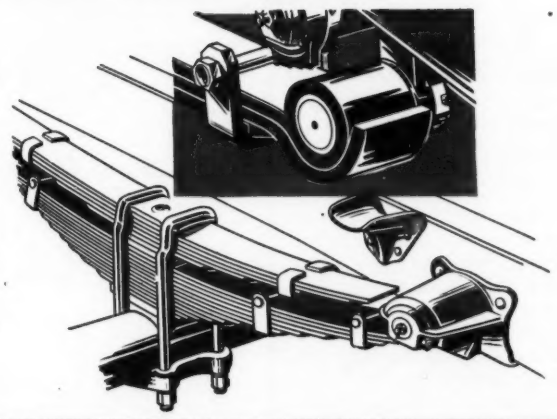
90 6 H.P.
YOUR PICK OF POWER
100 V-8 H.P.

This heavy duty 134-inch wheelbase Ford, equipped with Thornton Drive, is discharging ready-mixed concrete from its 4-cubic-yard Dumperete body, built by Maxon Construction Co. Dayton, O.

"FORD TRUCKS LAST LONGER!"

ONE big reason:
FORD SPRINGS STAND UP!

Ford spring engineering provides unsurpassed endurance. Ford special alloy spring steel, with tensile strength of 200,000 pounds per square inch, assures high fatigue resistance, while deflection rates scientifically proportioned to each vehicle's gross weight assure good riding with generously ample load capacity. Long-wearing shackle bushings of steel-backed bronze reduce maintenance expense. Ford special, wrapped "safety eyes" on heavy duty front springs (illustrated) reduce stress on main leaves, afford longer life and extra safety. Hydraulic *double-acting* shock absorbers on light duty models further ease the ride and control the load.



Ford

ONLY FORD GIVES YOU ALL THESE LONG-LIFE TRUCK FEATURES: Your choice of two great engines, the 100-H.P. V-8 or the 90-H.P. Six—semi-centrifugal clutch that needs no maintenance lubrication—rear axle design that takes all weight-load off the shafts (¾-floating in half ton units, full-floating in all other)—heavy channel section frames, *doubled* between springs in heavy duty models—big, easy-action brakes, with heavy, cast drum surfaces, non-warping and score-resistant—extra-thick sheet metal in cabs, cowls, skirts and fenders—all told, more than fifty such examples of Ford endurance-engineering. That's why FORD TRUCKS LAST LONGER . . . why 7 out of 11 of all Ford Trucks built since 1928 are still in service. No wonder the average age of all Ford Trucks in use is nearly 9 years! Stamina is built into them! See your Ford Dealer NOW!

FORD TRUCKS

MORE FORD TRUCKS IN USE TODAY THAN ANY OTHER MAKE

The new Little Giant portable power saw for land clearing is designed to fell trees up to 48-inch diameter. It is one-man-operated.

Portable Power Saw Cuts at Ground Level

A portable power saw, mounted on pneumatic wheels, for use in land clearing is announced by the Little Giant Tree Feller Corp., P. O. Box 695, 202 So. Haskell Ave., Dallas 1, Texas. The blade can be used in any position from vertical to horizontal; in the horizontal, it is said to cut trees off at ground level without leaving any stump.

The saw is one-man-operated, and the manufacturer says it can fell thirty 2-foot-diameter trees in 30 minutes. With the blade in an adjusted position, it can be used for bucking or notching. Various-size saw blades may be used up to those large enough to fell trees of 48-inch maximum diameter. Also, with attachments interchangeable at the transmission, the unit can be converted into a chain saw.

The saw is powered by a Wisconsin 4-cylinder air-cooled gasoline engine. The power output is 22 hp at 2400 rpm. The fuel tank has a capacity of 6 gallons, which is sufficient for 8 hours of operation, according to the manufacturer. The oil sump holds 4 quarts, with oil changes recommended every 100 hours of operation.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 10.

Diesel Mfrs. Assn. Elects 1947 Officers

Officers for this year were elected at the annual meeting of the Diesel Engine Manufacturers Association held in Chicago in December. E. J. Schwanhausser, Vice President of Worthington Pump & Machinery Corp., was re-elected President. Re-elected Vice Presidents are J. E. Peterson, Vice President of the General Machinery Corp., and Gordon Lefebvre, President of Cooper-Bessemer Corp. Robert H. Morse, Jr., Vice President and General Sales Manager of Fairbanks, Morse & Co., was again chosen to serve as Treasurer. Harvey T. Hill, who for three years has been Executive Director of the Association, was appointed to continue in that capacity.

Headlining the speaking program was Charles F. Kettering, General Manager, Research Division, General Motors Corp., whose topic was "What Is Our Competition?"

Some of the topics discussed at various sessions included the work of diesel engineers and the problems confronting them; suggestions on a proposed reprinting of the Association's book, "Standard Practices"; research programs and activities; and the relationship between the engineering departments of diesel-engine builders and the engineering colleges of the country.

Some of the activities for 1947 will include cooperation in the meeting of the Oil and Gas Power Division, American Society of Mechanical Engineers; constructive work with colleges and universities to improve educational facilities in the diesel-engine field; and keeping members informed on legislation in which they will be interested.

A discussion on diesel-engine fuels was led by Mr. Morse. This discussion centered on the desirability of cooperation between oil companies and diesel-engine manufacturers, to the end that there will be ample supplies of fuel oils for existent and forthcoming diesel engines.

N.Y. Moves to Remove Illegal Road Signs

Preliminary surveys of advertising signs erected along the highways of New York State have been completed. They disclosed the existence of a considerable number of illegal signs and billboards along state highways and within highway right-of-ways, as well as many outside highway right-of-ways which have been classified as dangerous or objectionable to traffic. Most of the signs found on the actual highway right-of-ways are privately owned, advertising some business conducted on the adjacent property.

Subdivision 11 of Section 1423 of the Penal Law forbids placing advertising signs of any type within the highway right-of-ways. Steps are therefore being taken, through contacts with individual owners of such illegal signs, for their immediate removal.

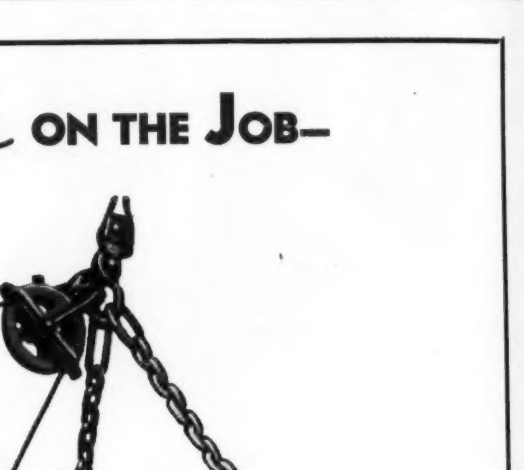
All other signs situated outside highway right-of-ways and on private property, which have been classified as hazardous to the free flow of traffic, have been listed as to location, type, and objectionable features. Agreements have already been reached with nearly all outdoor advertising companies owning or operating such signs, to effect their removal or alteration. Discussions with other owners to bring about similar cooperation are under way.

The survey was undertaken after outdoor advertisers voluntarily agreed to work with the Department in a program of rectifying undesirable features found in their displays.

MARVEL CONCRETE VIBRATORS

also
Asphalt and Tar Kettles
Portable Hoists
Generator Sets
Utility Saw Rigs
Utility Torches
WRITE FOR DETAILS

Marvel Equipment Company
224 S. Michigan Avenue
CHICAGO 4, ILLINOIS



WHEN IT'S *Hurry* ON THE JOB—

IT'S TIME FOR A YAUN

Shell-Type Bucket

You swing more payload because you swing less bucket weight with a Yaun. All-welded construction means as much as 1/3 saving in weight over the usual type of dragline bucket, and greater strength and durability. Amsco manganese wearing parts, stellited lip and removable tooth points prolong bucket life. The open construction of the Basket-Type bucket (a duplicate of the Shell-Type shown here, except that the rear is made of flat steel bars instead of sheet steel) means there's no back pressure and water surge to retard wet digging and no suction to hold back dumping.

Both Yaun's Shell-Type and Basket-Type buckets are available in light, medium and heavy-duty types in capacities from ⅜ to 24 yards.

YAUN DRAGLINE BUCKETS
PATENTED
Baton Rouge, La.

"More YARDAGE with a YAUN"

Write, or ask your Yaun distributor for information.

County Mends Worn Roads With Asphalt

Hot-Mix and Cold-Patch Surfacing Are Batched At County Asphalt Plant; Other County Problems

✦KING County, Washington, where 41 inches of rain batters clay subgrades each year, has gone a long way towards solving highway restoration problems with asphalt surfacing. Batched from county-owned-and-operated plants, bituminous material can be distributed rapidly throughout the county. It is either run hot with RC-3 Shell asphalt for new construction, or mixed with MC-2 Shell asphalt and used cold, from stockpiles, for maintenance patching.

The county-owned plant is the most economical method of producing large quantities of this material, according to H. R. Hill, Assistant District Supervisor and Superintendent of the Bow Lake asphalt plant in Seattle. By selling gravel to home owners, small contractors, and industries for 5 cents a ton, King County paid for nearly half the land at the asphalt plant in less than 5 years.

Aggregates

At the Bow Lake plant, aggregates for bituminous-material mixes are taken from a pit inside a 30-acre tract of land. Loaded to trucks by a Marion 1½-yard power shovel, the rock is then hauled by dump truck to a receiving hopper, and passed through a jaw crusher before it hits a conveyor belt leading to a rock-crushing plant. In general, the hauling distance never exceeds 500 feet.

The plant for crushing and classifying rock is a composite of many makes. It was set up by county labor and added to, over the years, whenever they could find a machine or a part to improve it. The roll crushers of this plant ultimately reduced rock to ⅝ inch and smaller for use with asphalt. The same pit from which this rock is taken furnished many tons to private users and paid for a considerable part of the tract.

Crushed rock feeds directly to the drier at the asphalt plant, and any excess material is trucked to road maintenance jobs within a 20-mile radius. King County tries to eliminate rehandling of material.

A single drier with an oil fire heats the rock and removes moisture before the aggregate passes through screens to the bin scales. The plant has an inclosed hot-bucket elevator 15 feet high for lifting aggregate from the drier. The heat and absence of moisture is gaged entirely by the skill of the plant operator, for there is no pyrometer.

Before it is weighed, the rock passes over a double-deck 3 x 6-foot Cedarapids vibrating screen with a ⅝-inch mesh on both decks, and then drops into a single-bin aggregate hopper ahead of the scales. After it is weighed, the aggregate passes into the pugmill.

Asphalt

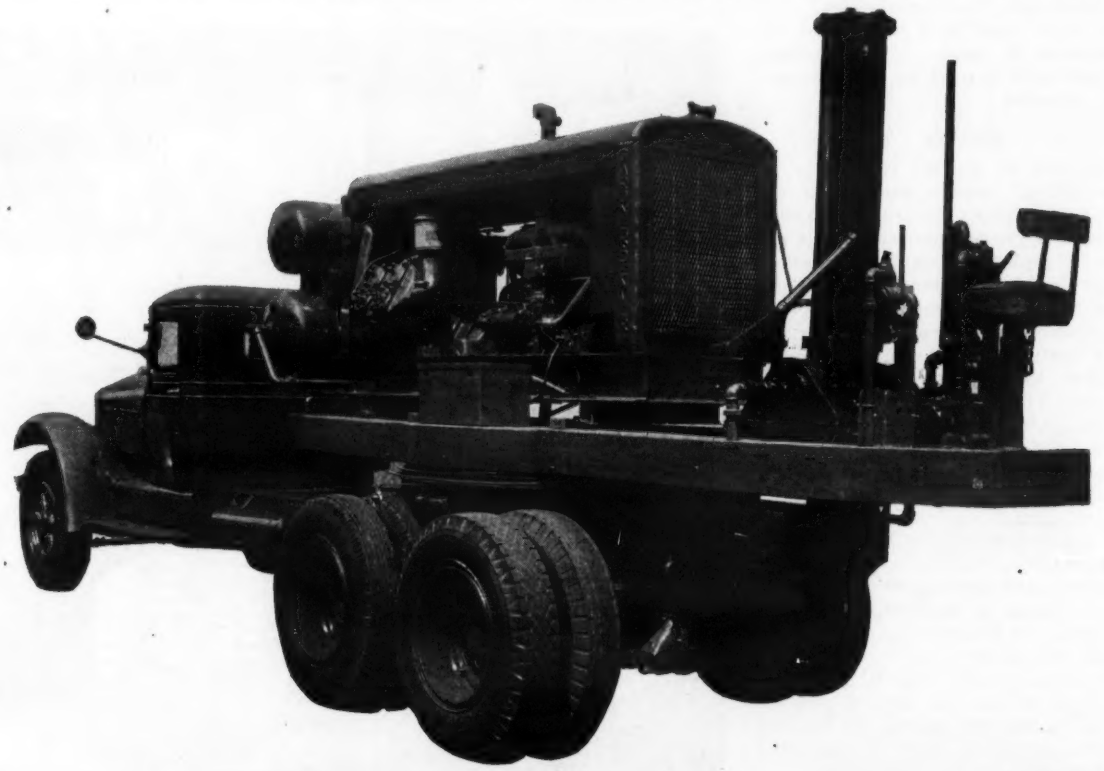
King County purchased seven junked railroad tank-car reservoirs, each capable of taking 10,000 gallons, for use at the Bow Lake plant. These were hauled in, set up horizontally behind the boiler house for the storage of asphalt, and fitted with steam-heating coils. Three of the tanks are now used for the storage of RC asphalt; four are used for MC.

For the first four years a small steam boiler was used to maintain asphalt heat, but now a new Leffel 35-hp horizontal stationary Scotch marine boiler is being installed and tested for that purpose. The old boiler used an electric blower for atomizing its fuel, but the new Leffel utilizes steam jets for more efficient atomization.

(*Continued on next page*)

C. & E. M. Photo

A Marion 1½-yard power shovel loads a dump truck with alluvial-run gravel. The aggregate will be put through a crushing plant and later mixed with asphalt to provide surfacing for roads in King County, Washington.



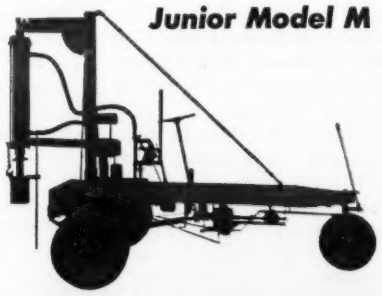
Break Concrete—The Low Cost Way

with

RAPID PAVEMENT BREAKER MACHINES

- Unequaled performance in concrete breaking.
- Fastest pneumatic method.
- Not a drop weight, but a pneumatic controlled blow.
- Average working speed, 55 blows per minute.
- Saves labor-time-dollars.
- Built to have a low upkeep cost.
- Breaks to any size desired.
- Adapted to inside or outside work.
- Increases your compressor output.
- Ideal for cutting trench and tamping backfill.
- The profitable addition to your line of equipment.
- Heavy-duty machine equipped with air motor which pivots the unit on the truck bed.
- Junior Trailer Models are equipped with air motor that propels machine and swings the boom.

Junior Model M

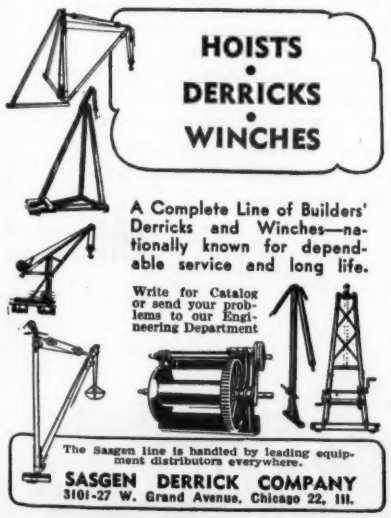


- Model-H can be converted to vertical machine in 30 minutes.
- Junior Model T for mounting on truck with compressor also available.
- Write for details and prices.

Junior Model H

R. P. B. CORP.

1517 Santa Fe Ave. Los Angeles 21, Calif.



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A Complete Line of Builders' Derricks and Winches—nationally known for dependable service and long life.

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The Sasgen line is handled by leading equipment distributors everywhere.

SASGEN DERRICK COMPANY
3101-27 W. Grand Avenue, Chicago 22, Ill.

County Mends Worn Roads With Asphalt

(*Continued from preceding page*)

The County does its own asphalt hauling with Oshkosh four-wheel-drive tank trucks, equipped with heaters and transfer pumps. By hauling from the Harbor Island Shell plant in Seattle the County saves 5 cents per ton. It pays $13.90 per ton for both MC and RC asphalts. It has also purchased some MC from the Union Oil Co.

Asphalt is transferred from storage by a steam-driven Fairbanks-Morse reciprocating pump. A 100-gallon superheating reservoir at the plant takes asphalt from storage and adjusts the temperature to fit the mixing condition. The level of this superheating reservoir is controlled by the plant operator to hold asphalt movement generally one way—from storage to reservoir. The superheating reservoir can be drained back to storage, in an emergency.

The boiler uses No. 5 heavy fuel oil to generate its steam. A 3,500-gallon steel reservoir is used for the storage of this material.

Batches

Regardless of asphalt type, only a single kind of batch is ever mixed at the Bow Lake plant. It consists of 1,000 pounds of aggregate and 40 pounds of MC or RC asphalt. RC mixes go directly from the plant to dump trucks, and are hauled out to the many resurfacing jobs which go on six months a year in King County. MC mixes are generally stockpiled by an extension conveyor belt about 120 feet beyond the loading point for RC mix, and then loaded and hauled as required. Maintenance patching goes on all year despite heavy rains from September to May.

Hot-mix trucks are not weighed. If they have been hauling rock, their beds are wiped down with diesel fuel to keep the asphalt mix from sticking. Loads are not covered by tarpaulins, and asphalt mixes are heaped on as heavily as the law will allow.

King County is interested in quantity production at low cost, in a practical black-top strong enough to bear traffic and dense enough to keep the rain off clay subgrades. Its mix compares favorably with State Highway Department specifications, without the loss of production that sometimes seems to plague operators who search for absolute perfection.

C. & E. M. Photo

The Bow Lake asphalt plant of King County, Wash., is shown here in the far left background, with a conveyor delivering MC patch-mix to a stockpile. At the right is the conveyor from the jaw crusher to the crushing plant.

A crew consisting of a plant foreman, five asphalt-plant laborers, and five crusher-plant laborers regularly turns out 250 tons per 8-hour day. This figure is consistent, and the best record ever established since the plant was set up at Bow Lake in 1941 was 286 tons in 8 hours.

Since the present plant is a converted portable set-up with limited capacity, plans for future improvements include building a larger stationary plant for the running of RC mixes, and retaining the present plant in its entirety for MC work.

A more modern Barber-Greene continuous-mix asphalt plant and an aggregate-production unit for District No. 3 in the northern half of the county have now been in operation since August, 1945. It is located one mile east of Woodinville, Wash. Assistant County Engineer Grover C. Gaier designed and built this set-up and now is in charge of its operation. It produces one ton of excellent paving asphalt each minute for use by King County, also for sale to the State Highway Department and to some small towns in this area.

The Woodinville plant is very efficiently planned. By means of a dragline and a novel portable grizzly and reciprocating feeder, the raw material is taken directly from any portion of a 30-acre gravel deposit by conveyor belt to the vibrating screens, jaw crusher, cone crusher, the Barber-Greene flame drier and gradation unit, and then to the continuous asphalt-mixing pugmill.

A daily output of 250 cubic yards of road gravel is also produced at this plant.

(*Continued on next page*)

GRIFFIN

WELLPOINT SYSTEMS

JETTING PUMPS

FOR SALE RENT

Prompt Shipments

Send for our New 60 page illustrated catalog

"GRIFFIN POINTED WELLPOINT FACTS" chock full of latest information on Wellpoint Systems for dewatering, emergency and permanent water supply systems, also information on pressure pumps and data for jetting.

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Announcing – **NEW MODELS INTERNATIONAL TRUCKS**

Truck owners will operate them—drivers will drive them—*with greater pride than ever before.*

They're the new KB Models of International Trucks—outstanding products of advanced design, engineering and research—newly styled with flowing lines sharply accented by gleaming chrome, and with 95 features and improvements variously incorporated throughout 15 basic models.

And fully qualified to do their jobs with new economy, new ease of operation, and the rugged stamina for which Internationals are *famous!*

They're the finest values in more than 40 years of International Truck history. And International values have always been outstanding—so outstanding that for 16 years more heavy-duty Internationals have served American commerce and industry than any other make.

In the *complete* International Line there's the right truck for every hauling job. And back of every truck is *specialized* International Service—supplied by the nation's largest company-owned truck-service organization, International Branches—and by International Dealers everywhere.

Yes, the new KB Internationals will be owned and driven with pride—with pride and profit—because these rugged trucks perform with unbeatable economy.

TRUCK OPERATORS! For details of the 95 FEATURES AND IMPROVEMENTS in various models of the new KB Internationals, see your International Branch or Dealer.

Motor Truck Division
INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue, Chicago 1, Ill.

Tune in James Melton on "Harvest of Stars" every Sunday! NBC Network. See newspapers for time and station.

INTERNATIONAL Trucks

County Mends Worn Roads With Asphalt

(*Continued from preceding page*)

County Road Problems

King County, with an area of 2,152 square miles, is the largest of 39 counties in the state of Washington. There are 1,150 miles of county road in the north district, 1,049 miles in the south district, 114 miles on Vashon Island, and 35 miles on Mercer Island; the latter two are residential districts.

At least 50 per cent of King County roads are hard-surfaced; 1,307 miles carry mail routes, and 1,132 miles carry school buses. The assessed valuation of county real estate is more than $80,000,000.

That's the statistical picture. But high up on the ninth floor of Seattle's modern County-City Building is a graying, busy engineer who knows there's more to the picture than that. His name is C. O. Mannes, and his title is County Road Engineer. It is his job to keep the miles of county roads and bridges repaired and serviceable, to check plans and issue building permits, to do all design and engineering work on a big future road program, to pass on official franchises and public-utility permits, and to survey subdivision plats. His leisure time is then occupied with the study of 60-foot right-of-way acquisition for new roads.

For King County is the most metropolitan in the state. Seattle is the county seat, and the road system carries industrial traffic as well as passenger automobiles and agricultural trucks. Situated on the west side of the Cascades on the Pacific Ocean, King County roads run from sea level to 4,000 feet. And they get two things not calculated to make them long-lived: rain and heavy wheel loads. One-third of all gasoline-tax funds the State collects comes from King County. These facts, too, all mean problems for Engineer Mannes.

King County Organization

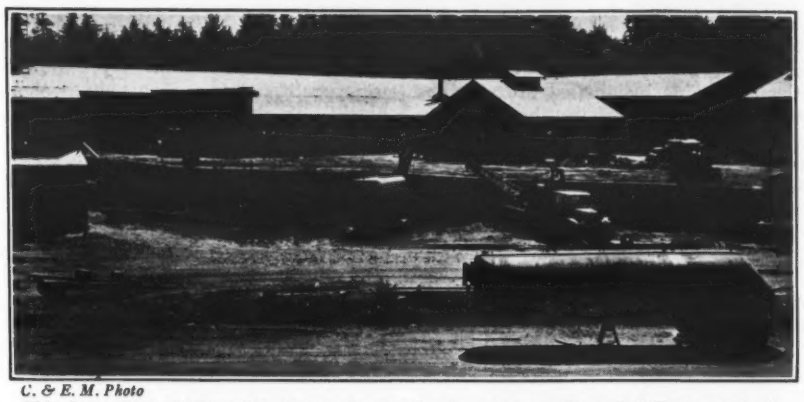
County engineering is directed by three county commissioners elected by the citizens. They appoint the county engineer, who hires his own help independently, or in a few cases at the sanction of the commissioners. Mr. Mannes was appointed November 13, 1944.

District 3, in the northern half of the county, is engineered by Grover C. Gaier, who is Assistant County Engineer. In District 2, the southern half of the county, District Engineer H. A. Kyle presides. One of Kyle's collateral jobs is that of Sewage Engineer. W. D. Shannon is the County Purchasing Agent, with authority to make open-market purchases of small items.

The County tries, within the limits of changing elections, to retain good help. It has a war-veterans' agency, where former servicemen are interviewed and put to the kind of work for which their experience and training qualify them.

Funds for maintenance originate in a 3-mill road-tax levy and from gasoline and registration taxes. Lately the Public Roads Administration, with matching state funds, has helped the County. Apportionment of the gasoline-tax fund is a sore spot in King County. According to state law, it shapes up like this:

Heaviest in automobile registration, King County is responsible for about one-third of all gas-tax revenue. But 44 per cent of the gross amount goes to the State Highway Department; 15 per cent goes to cities; and 41 per cent of the gross amount goes to Washington's counties. Multiply this latter figure by 0.1042, and you have King County's share of the take, only about 5 per cent of the total. There is a feeling in King County that somebody is holding the well known bag.



C. & E. M. Photo

This is a view of King County's main repair shop and auxiliary buildings at South 188th Street, Seattle, Wash. It is to the right of the asphalt and crushing plant.

Despite these shortages, the County is improving its roads and currently is working up a long-range road program for the near future. Operating in the southern district, for example, 170 pieces of rolling equipment, which include four 8-yard Kenworth trucks, five 5-yard Whites, six 3½-yard Internationals, three bulldozers, ten 2½-yard Chevrolet trucks, six 5½-yard Diamond T trucks, five power shovels, and a Unit crane, the County is equipped fairly well to take care of its road problems, varied and serious as they are.

The County also uses a full-time Safety Inspector, H. K. Clemens, who investigates accidents, reports them, and suggests preventive measures. Clemens works in cooperation with the county sheriff and coroner.

Road Maintenance

Most of King County's roads are hard-surfaced, with 20-foot pavement.

(*Continued on next page*)

CONFIDENCE... how much is it worth?

IN 1841, two years before the first telegraph line was installed in this country, and when there were but 27 states in the Union, John August Roebling was inspired with the idea of making a new kind of rope of unheard of strength and flexibility. His confidence in his idea caused him to risk everything he had on the development of his new rope.

How much is his confidence worth to Industry today, which couldn't turn a wheel without the modern wire rope?

Today, the John A. Roebling's Sons Company invests much time, effort and money in the development of improved products to keep alive the confidence of its many customers.

Roebling values this confidence as its greatest asset. That's why it offers you the greatest value for every dollar you invest . . . in *any* Roebling product.

HOW TO SAVE WIRE ROPE DOLLARS

Wire rope is a machine of many parts and, like any machine, even the finest of wire ropes can be destroyed quickly through faulty installation or improper maintenance. To insure against this possibility, Roebling established its Field Engineering Service.

Every Roebling Field Engineer has a thorough knowledge of wire rope . . . its types, its uses, its features and limitations. This knowledge plus the experience he gains in his daily contacts can be a great asset to you . . . helping you to solve those tough wire rope problems . . . giving you more service for each wire rope dollar.

Get to know your Roebling Field Engineer. Call him at your nearby Roebling Branch Office.

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FOR EXAMPLE—"BLUE CENTER" STEEL WIRE ROPE

Roebling entrusts your confidence in Roebling and Roebling products to the performance of its "Blue Center" Steel Wire Rope. It is the best rope Roebling knows how to make. It is available as preformed or non-preformed, in a complete range of sizes and constructions to meet a great variety of operating conditions. Its uses are almost unlimited and its performance is consistently economical.

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ROEBLING

A CENTURY OF CONFIDENCE

County Mends Worn Roads With Asphalt

(*Continued from preceding page*)

The County's resurfacing program is the nearest thing to new construction in five years, but it has been a summer activity regularly, even during the war. Many miles of modern highway now prove that fact.

Heavy rains, especially in mountainous country, play havoc with even the best-built highway. Heavy wheel loads whip potholes in a black-top surface in a matter of days. The maintenance of hard-surfaced highways—maintenance which corresponds in quality to that of the Washington State Highway Department—is intended to restore wearing surface over these holes before they enlarge.

Trucks haul MC cold-patch material from stockpiles at the asphalt plants, and maintenance crews place it. The holes are blown or brushed out to free them of all moisture. Bottoms and sides get a coat of MC-2 asphalt, daubed on. The cold-mix surfacing is then layered in and tamped. Holes are usually patched high by about ¾ inch to allow for traffic compaction.

One of the big failings of maintenance crews is the over-oiling of patches. King County effectively stymies that bad practice by mixing its patch material at its hot-mix plants and storing it for use. It contains only 4 per cent of asphalt in a fine mix.

Roadside Work

The spring and summer months in this moisture-ridden county are great for the production of luxuriant vegetation. Weeds, grasses, and shrubs grow in great profusion. Roadside planting has never been a problem; rather, the control of vegetation as a safety measure has been the biggest headache.

Several Topeka and Case mowers work road shoulders regularly. (County Engineer Mannes points out that black-top roads do not fill the shoulders with rocks, which are so destructive to mowers, as gravel roads do.) But the County is unfortunately short of mowing equipment, and it will probably have to wait a while longer before new machines are again available.

Bridges

Maintenance work on bridges has of recent years been limited to painting. In this great timberland, timber is the forgotten commodity. Very little can be purchased. The situation on structural steel is as bad. Mannes realizes that by letting the bridges go, at this time, he will have a big bridge maintenance job several years from now. But perhaps materials will then be more plentiful.

Drainage

Most county roads are down out of the snow belt, and therefore do not require snow removal. But by the same token, they do require drainage, for the precipitation comes as rain. Drainage is one of the problems so serious that it calls for the formulation of new policies.

More and more, property owners have come to regard county highways as a dumping spot for excess water and refuse. Aggravated drainage problems always mean weaker subgrades and more maintenance. This is trying, and the County is taking steps to stop it. The County Engineer's office is trying to encourage the forming of drainage districts to carry surface water off through natural watercourses.

One other bad problem is this one of waste products being dumped in roadside ditches. Ordinarily, roadside ditches are cleaned several times a year, and always before any resurfacing. But where a property owner lets his septic tank overflow into a roadside ditch, the County simply refuses to clean it. This hardboiled attitude has been a success. Make the property owner clean his own ditch, or pay to have it done, and you have come a long way towards making him a Christian, so far as sanitation is concerned.

Shop Repair Facilities

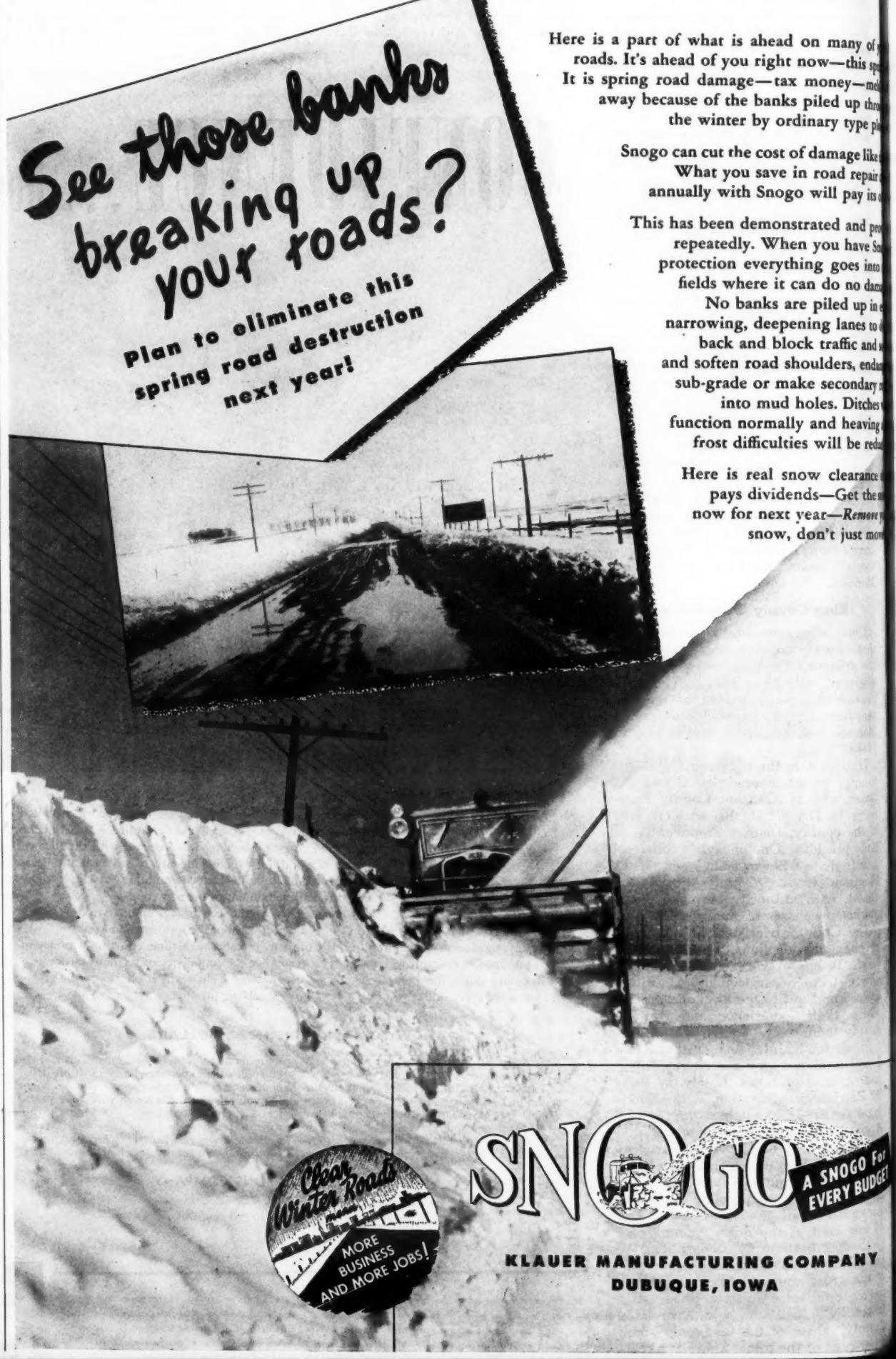
King County maintains two repair shops for equipment: at Redmond, and on South 188th Street, Seattle, where one of the asphalt plants is located. The shop at 188th Street is about 150 feet long by 60 feet wide, including the stock room for spare parts. It is built of wood, with imitation brick veneer on the outside. Other auxiliary buildings for repair include a carpenter shop, blacksmith shop, and battery-charging shop.

The battery-charging shop has facilities for recharging twenty-one 6-volt batteries simultaneously. It averages four battery rechargings and two rebuilding jobs each week. A rebuilding job consists of installing new plates and separators, sulphuric acid, and distilled water. It requires about 24 hours to charge a 6-volt battery, and a heavy-duty floor charger can bring tractor batteries up in 8 hours without removing them from the machines.

The battery shop is equipped with a battery charger, a General Electric Tungar battery-charging set, and small tools for installing new plates and separators.

The blacksmith shop turns out a steady stream of bolts, shovel teeth, pugmill liners for the asphalt plant, grader parts, and special tools. It is equipped with a drill press, a shop-built Champion sickle grinder, a bench grinder, a 75-pound Bradley trip hammer, a power whetstone, a forge, anvil, two bench vises, a Marvel hacksaw, and an oxyacetylene welding and cutting

(*Concluded on next page, Col. 2*)


See those banks breaking up your roads?
Plan to eliminate this spring road destruction next year!
Here is a part of what is ahead on many of
roads. It's ahead of you right now—this sp
It is spring road damage—tax money—me
away because of the banks piled up thro
the winter by ordinary type pl
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What you save in road repair
annually with Snogo will pay its
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fields where it can do no dam
No banks are piled up in
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back and block traffic and
and soften road shoulders, endan
sub-grade or make secondary
into mud holes. Ditches
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The Jaques power saw is shown here with its 30-inch blade used horizontally for felling trees and brush even with the ground.

Portable Power Saw And Post-Hole Digger

A portable power saw and a post-hole digger are now being made by the Jaques Power Saw Co., P. O. Box 695, Denison, Texas. The saw has a 30-inch circular blade which can be used horizontally for felling trees or clearing brush, and vertically for cutting and trimming logs to length. It is powered by a 5 to 6-hp engine. The saw is mounted on a two-wheeled carriage using 4.00 x 12 pneumatic tires.

The company also makes a saw in a size suitable for mounting on a wheel tractor. It is operated by one man from the tractor seat, and power is obtained from the tractor engine. It comes equipped with a steel arm in front to help push the tree in the direction you desire it to fall. The tractor-mounted saw uses a 60-inch non-breakable steel saw blade.

The post-hole digger is available as a separate unit, or as an attachment for installation on the portable saw. The company states that in ordinary ground, it can bore 9-inch holes to a depth of 3 feet in 60 seconds or less.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 11.

Powered Concrete Buggy

A broadside describing the Buggymobile is available for the asking from the Mixermobile Co., Inc., 245½ So. Western Ave., Los Angeles 4, Calif. The Buggymobile is a Chrysler-engine-powered concrete buggy for moving and placing concrete. The use of the buggy is said to reduce the number of times that a mixer would have to be moved, and also reduces the number of men, wheelbarrows, and related equipment required.

The Buggymobile is a three-wheel unit, driving and carrying its load on the front drive wheels, and steering by the rear tail wheel. The hopper holds 27 feet of concrete, and it carries its own chute for directional pouring.

The bulletin has a large center sheet showing the unit in action on several jobs, and points out its versatility and features. Also listed are its specifications and dimensions.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 75.

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FACTORY BRANCH
12303 Cloverdale Ave., Detroit 4, Michigan

County Mends Worn Roads With Asphalt

(*Continued from preceding page*)

set.

The main repair shop, where fifteen pieces of heavy equipment can be serviced or repaired at once, has a modern list of special equipment as follows:

1 Alemite extreme pressure set
1 Yale 5-ton hand hoist
1 Diehl-powered Presto tire-demounter
1 Shepard-Thomason riveting set
1 Pacific steel boiler for heating the shop
1 Jennings vacuum heating pump
1 Branick tire spreader
1 U.S.-powered bench grinder
1 Barnes 26-inch drill
1 Canedy-Otto drill press
1 Van Norman boring bar
1 American 15-inch lathe
1 Modern Machine Tool drill press
1 Sidney 16-inch lathe
1 Van Dorn 10-inch ball-bearing grinder
1 50-ton shop-made hydraulic press
1 Sioux valve-face grinding machine
1 Stanley drill
1 Yale spur-geared block
1 United Motor-testing set
1 Weaver 20-ton press

The shop at Redmond, Wash., is very similar. Equipment which has long since passed its most useful period of service is given a periodic "shot in the arm" in these modern shops, and kept on the job. Shortage of spare parts is, of course, acute. But many parts are made up in the shops when they cannot be purchased. With open-market buying authority, the County is in an even better position to purchase spare parts than the State Highway Department.

By keeping its highway system serviceable through the war, and constantly improving it, King County has already moved a long way towards a post-war highway system adequate to handle its traffic.

AED and AGC Form Liaison Committee

The establishment of a Joint Co-operative Committee between the Associated General Contractors of America and the Associated Equipment Distributors has been announced jointly by officials of both groups. It is felt that through this committee a closer and better understanding will be obtained by contractors and equipment distributors of their mutual problems, and that through it practical suggestions will be received and can then be developed for working towards improved conditions in the construction industry.

Members of the Associated General Contractors of America on the committee are D. W. Winkelman, Syracuse, N. Y.; R. E. O'Connor, Fort Wayne, Ind.; J. D. Bonness, Milwaukee; E. G. Hoeppner, Eau Claire, Wis.; John MacLeod, Clearwater, Calif.; and F. B. Winston, Minneapolis. Representing the Associated Equipment Distributors will be A. F. Garlinghouse, Los Angeles; G. W. Swart, Grand Rapids, Mich.; P. A. Dufford, Boise, Idaho; J. N. Harvey, Baton Rouge; E. J. Crosby, Boston; and R. E. Corson, Denver, Colo.

Among the subjects which have already been suggested for discussion are problems of surplus equipment, equipment sales contracts, servicing new equipment, repair parts orders, day labor, and equipment standardization.

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Seeding and Mulching Methods in Minnesota

Important Operations in Roadside Development Help Control Erosion and Improve Right-of-Ways

By HAROLD E. OLSON, Engineer of Roadside Development, Minnesota Department of Highways

✦ LANDSCAPE design has had a marked effect on grading projects in Minnesota. Plans for such projects designed by the Minnesota Department of Highways now include (1) a streamlined cross section, (2) conservation of existing tree growth and plant material on the highway right-of-way beyond construction limits, and (3) the conservation and replacement of topsoil in areas disturbed by grading operations. Sharp slopes and ditch gradients are being sodded and plant material is being installed for erosion control and for ground cover and landscaping.

On new grading projects, contractors are required to seed all areas disturbed by grading operations. Seed materials are furnished to the contractor by the State. They are available to him, in whatever quantities may be required, from whichever of the sixteen district maintenance shops is located nearest the site of the work.

In general, Class II seed consisting of the Kentucky bluegrass formula is used on the slopes of farmstead and cemetery frontage, on slopes in timbered areas, and in urban areas. This formula, sown at the rate of 120 pounds to the acre, is as follows:

Kentucky bluegrass	66 lbs.
Redtop	24 lbs.
Alsike clover	6 lbs.
Brome grass	6 lbs.
Winter rye for fall seeding, and oats for spring seeding	18 lbs.

The mixture forms a dense permanent sod which acts as an excellent ground cover and erosion-control factor. It also adds greatly to the appearance of the roadsides.

Class XVIII seed is used in all other locations. It is comprised of a formula using alfalfa, medium-red clover, or crested wheat grass in the following quantities:

Alfalfa (northern grown, not common), medium-red clover, or crested wheat grass	15 lbs.
Brome grass	13 lbs.
Winter rye for fall seeding, and oats for spring seeding	32 lbs.

This seed is sown at the rate of 60 pounds to the acre and furnishes an excellent forage crop. When it is sown along the open road, the farmer whose property borders the road is usually glad to crop it with a resultant saving in mowing expense to the State.

Seeding After Finishing

Seeding along new grades is done immediately after the finishing operations on an area have been completed. The engineer directs the class of seed to be used. This method provides a ground cover on the cut and fill slopes before erosion can set in or before the slopes dry out and become hard.

The season for planting Class II, Kentucky bluegrass seed, is April 15 to June 15 and August 15 to September 15. On grading areas completed between June 15 and August 15, a temporary ground cover of winter rye is sown to control erosion; it is followed by a planting of the permanent crop in season.

The season for planting Class XVIII formula is April 15 to August 15. On grading areas completed after August 15, a temporary ground cover of winter rye is sown, followed with the permanent crop the following spring.

On the first projects on which bids were received during the construction season just past, prices varied widely. One project in the western part of the state was awarded on a bid of $12 per acre while another project was awarded at $5 an acre. Bids on one project located near the Twin Cities were rejected when the lowest bid received ran $50 per acre.

Mulching

During the last few years, both the Construction and Maintenance Divisions of the Department of Highways have done a great deal of experimenting with mulching. In this connection it might be proper to explain the meaning of "mulch", which can best be done by quoting from an item which appeared in CONTRACTORS AND ENGINEERS MONTHLY for May, 1945, on page 21:

"There seems to be some misunder-

(*Continued on next page*)

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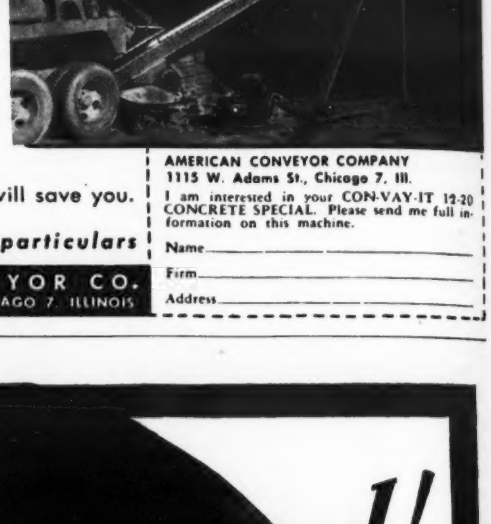

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Minnesota Department of Highways Photo

To control soil erosion, the Minnesota Department of Highways planted 33,000 sumac along Trunk Highway 58.

Seeding and Mulching Methods in Minnesota

(Continued from preceding page)

standing as to the meaning of the word 'mulch', due to confusion between farm tillage practices and the operations of roadside-development engineers on highway projects. After considerable discussion with roadside-development engineers and landscape architects, we find practically unanimous agreement as to the types of mulching operations, but still a lack of uniformity in terminology. The latter is already under discussion by at least one committee of the Highway Research Board.

"In roadside-development practice 'mulch' is a surface covering. It is sometimes held in place by twine tied to stakes to prevent its being blown about by the wind or by the passage of motor vehicles at high speed. Another method of 'tying' mulch is to press a part of the straw or hay slightly into the surface of the ground by a straight-set disk or Culti-Packer. In this latter method the mulch is worked into the ground only enough to tie it to the ground, and most of the mulch is still on the surface to protect the ground and seedbed from erosion by rain.

"Where such material as peat, muck, sawdust, straw, hay, or green manure crop are worked into the ground and mixed throughout a seedbed in order to add organic matter to a heavy clay or other deficient soil, it is in the nature of a soil amendment and is not referred to as mulching in roadside-development practice. The fact that the mixing of organic matter with the soil in farm tillage practice is frequently referred to as 'mulching' has been the cause of most of the misunderstanding."

So, by "mulch", in Minnesota Department of Highways operations, is meant the surface covering of the seedbed with hay, straw, grass, peat, sawdust, or other similar materials, rather than the use of any of these materials as soil amendments.

The mulching operations consist of first thoroughly disking the seedbed to loosen and aerate the soil to a depth of from 4 to 6 inches. The area is then seeded and harrowed, preferably with a spike-tooth harrow, and the mulch is spread over the surface at the rate of 2 tons per acre. This procedure has been proved to be effective by the U. S. Soil Conservation Service and is similar to the methods practiced by several other states.

Holding Mulch in Place

Various methods have been used to hold the mulch in place, such as: disking with a weighted disk which presses the material slightly into the soil; scattering loose soil on top of the mulch; laying snow fence on the mulch; pegging and tying twine to the pegs at about 12 to 16-foot intervals, and covering with cotton or paper mesh. This last method has been found to be quite expensive. It has also been found that rainfall will effectively compact freshly spread mulch and tie it into the soil.

Ohio has used large water tanks with sprayer attachments to soak down the mulch. When this method is used, the spraying action will spread enough soil out onto the wet straw to cement it to the ground. The water also is retained by the mulch and thus helps to give the seed a quick start.

Missouri has also demonstrated that watering the mulch will flatten it to the ground and cause much of it to adhere to the soil. Such watering is an aid to seed germination so that, with favorable conditions, enough growth is obtained in 4 to 7 days to help hold the mulch in place.

California has used a sheepsfoot tamper to tamp the mulch into the soil. About 4 tons of mulch are used to the acre. The material is tamped to a depth of from 3 to 6 inches into the seedbed, making the mulch an admixture rather than a surface treatment.

Advantages of Mulching

There is much to be said for the advantages of mulching. It reduces erosion by wind and water to a minimum; winter freezing, thawing, and heaving are lessened; the amount of water entering the soil is increased; and the evaporation loss of soil moisture is reduced. The effects of mulch with different tillage treatments have been found to be:

1. Straw, 2 tons disked in—rainfall conserved, 6.92 surface inches or 38.7 per cent; penetration 5 feet.
2. Seedbed disked, no straw—rainfall

(Concluded on next page)

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Seeding and Mulching Methods in Minnesota

(*Continued from preceding page*)

conserved, 3.49 inches or 19.5 per cent; penetration 4 feet.

3. Straw, 2 tons on seedbed surface—rainfall conserved, 9.72 surface inches or 54.3 per cent; penetration 6 feet.

4. Straw, 2 tons plowed in—rainfall conserved, 6.12 surface inches or 34.2 per cent; penetration 5 feet.

5. Land plowed, no straw—rainfall conserved, 3.71 surface inches or 20.7 per cent; penetration 4 feet.

Outstanding among these listed effects of mulch is No. 3. When 2 tons of straw were sown on the seedbed surface, a rainfall conservation of 9.72 inches or 54.3 per cent with a depth penetration of 6 feet was obtained.

Maintains Soil Structure

Mulching not only maintains good soil structure, but creates it. It will make both a heavy and a light soil more like a loam soil. Mulching supplies energy to the soil, producing food for soil bacteria; it makes and keeps some of the plant foods, especially phosphorus, more available than these foods would otherwise be.

Another advantage of mulching is that it generates nitrogen. This is naturally present in the soil and it also is contained in the mulch material. After a ground cover has been established, nitrogen continues to build up in the soil. Cornell University has demonstrated that in a 10-year period, 415 pounds of organic nitrogen were added to the soil under an acre of Kentucky bluegrass sod. Mulching itself is a non-seasonable operation which can be performed from early spring until freeze-up.

In summary, mulching is a means of getting a stand of grass under unfavorable conditions through the use of materials which conserve moisture, which shade and protect the young grass sprouts, which prevent the puddling of the soil and rapid run-off of water with consequent erosion. The mulch itself should be a material which can be easily held in place without a too elaborate or costly method of tie-down.

While the many advantages of mulching are recognized, considerably more experimental work in relation to materials and tie-down methods should be carried on. It cannot now be said definitely that any one material, method, or operation will give the best results under all conditions.

Minnesota Department of Highways Photo

Shown here are the slope seeding and planting done at a grade separation on the Belt Line Highway just west of Minneapolis, Minn.

Accidents are costly and unnecessary. Remember—Safety Always Pays!

Tandem-Roller Catalog

A new 12-page catalog describing its line of variable-weight tandem rollers has been released by the Galion Iron Works & Mfg. Co., 1941 Bond St., Galion, Ohio.

Catalog No. 296 describes the line of rollers available in weights from 5 to 14 tons. The features claimed for the Galion rollers include hydraulic steering, front-roll assembly adjustable for wear, an all-welded structural-steel frame, rugged final drive, and simple, heavy-duty transmission. These features are illustrated by sectional photographs accompanied by text giving complete details and specifications.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 74.

Roadside War Memorials

A trend in England towards increased interest in roadside development is reported in the November issue of "Highway Highlights", bulletin of the National Highway Users Conference. Suggestions have been made to dedicate wayside rests and beauty spots as war memorials. This would give motorists and travelers a chance to rest and enjoy the countryside and at the same time pay homage to the nation's war dead.

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BLADES
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Motor Graders, Maintainers, Scrapers, Drags, Bulldozers, Backfillers, Wagon Scrapers, Trail Builders, Trail Blazers, Carryalls. Also—

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6 to 12 TON CRANES

No waiting — no delays! Out on the job or around the yard MICHIGAN Mobile CRANE'S time-saving, cost-cutting operating speed, economy and truck mobility pays off on every lifting and excavating job. Long-time MICHIGAN owners will tell you that for crane, clamshell, dragline, trench hoe and shovel work the fully convertible MICHIGAN Mobile SHOVEL-CRANE is truly "speed and economy on wheels"!

Get all the facts—send for Bulletin CE-27

MODEL TLDT-20 CRANE 12-ton capacity. Power lowering as well as lifting. Large heavy duty hoist drum for precision crane work. Timken tandem dual drive axle. Total reduction in low gear 72.88-1. Four Timken-Westinghouse Air Brakes. 30 MPH travel speed.

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Zoned Equipment: Lowered Costs for Earth-Moving

Today's approach to the problems of earth-moving recognizes three basic zones, according to a booklet put out by the Caterpillar Tractor Co., Peoria 8, Ill., under the title, "The 1-2-3 of Zoned Equipment". Each zone has certain distinct requirements that make one type of equipment more suitable.

Zone 1, clearing and pioneering, requires power equipment, and Zone 2 requires slow-speed hauling equipment. The track-type tractor meets these needs, says Caterpillar. Zone 3 requires high-speed hauling equipment, or the wheel-type tractor. The booklet pictures and analyzes each of these zones and the power equipment used in each for maximum productivity.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 91.

Marquette in St. Louis

A new sales office has been opened in St. Louis by the Marquette Cement Mfg. Co., Chicago, Ill. It will serve the Missouri, southern Illinois, and southern Indiana marketing area. The new office is located in the Shell Bldg., 1221 Locust St., St. Louis 3, Mo. Harry C. Shields has been appointed Sales Manager for that district. He will be assisted by Kenneth F. Hackmann.

Hose-Coupling Data

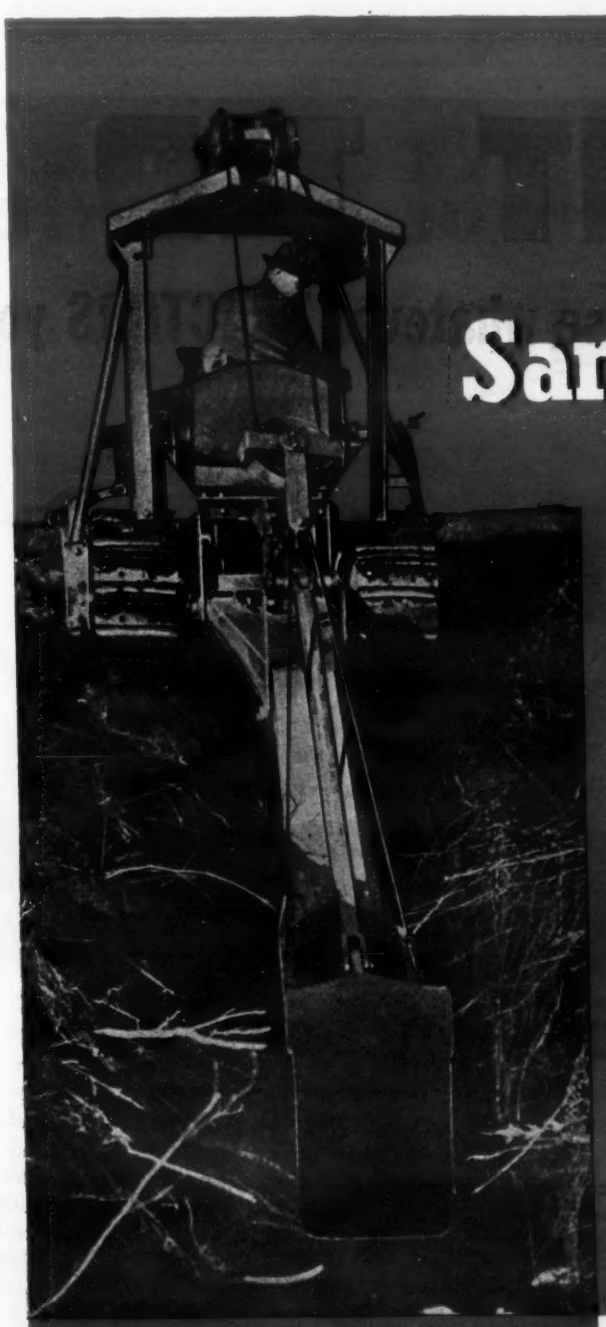
A 40-page catalog on hose couplings has been made available by the Dixon Valve & Coupling Co., 1700 No. Hancock St., Philadelphia 22, Pa. The catalog is bound in a stiff manila folder for insertion in the drawer of a standard file cabinet, and has a tab index for easy reference.

The catalog covers the complete line made by the company, as well as providing helpful suggestions for selecting and ordering the various items listed. Also included are eight steps which Dixon feels are important to follow when attaching couplings to air, water, or steam lines.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 92.

Fetzer Heads Mack Sales

Announcement has been made of the election of A. C. Fetzer, Vice President, to the Board of Directors of Mack Mfg. Corp. Mr. Fetzer at the same time was appointed to the position of General Sales Manager.



The New

Sargent BACKHOE

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For the first time anywhere Maine Steel, Inc. offers a Tractor Backhoe. The addition of the Backhoe to the Sargent Overhead Shovel and Bulldozer now gives you one package of rugged machinery that will do a variety of jobs in any city, town or county. It offers a contractor one kit of tools that will complete from start to finish any number of projects at low cost.

Available in two sizes to fit the Model B and D Cletracs, the Backhoe digs a trench 7 or 8 ft. deep. . . . Like the Overhead Shovel the Backhoe digs easily through hardpan and shale. . . . An automatic bucket cleaner cleans the bucket at every dumping. . . . This makes it a cinch to handle wet, clinging clay.

And the Overhead Shovel is always available for loading sand, gravel and stone in pit and quarry. It will rip up and load hard pavement; and during the winter months it's a great one-man snow loader.

For full information on the Sargent Backhoe and Overhead see your Cletrac dealer or write to us.

MAINE STEEL, INC.
South Windham, Maine

TESTS OF DIGGING TRENCH WITH THE SARGENT BACKHOE

With the trench 3½ ft. deep, in gravel and loam, with some shale ledge, the Sargent Backhoe has dug 200 ft. per hour.

With the trench 5 ft. deep, in gravel or loam under average conditions the Sargent Backhoe has dug 135 ft. per hour.

Trench 6½ ft. deep in clay under ordinary conditions the Sargent Backhoe has dug 75 ft. per hour.

Trench 6½ ft. deep in wet blue clay under very bad conditions the Sargent Backhoe has dug 60 ft. per hour.

The Backhoe boom and bucket can be attached in one hour. . . . And can be detached in about 10 minutes.

AASHO Annual Highway Meeting

Equipment Shortage Hit By Special Resolution; Other Problems Discussed; 1947 Officers

✦ LASHING out by special resolution at curbs and impediments to the nation's road-building program, the American Association of State Highway Officials in its 32nd Annual Meeting at Los Angeles December 17-20 sought, among other things, to "request and urge the allocation of equipment to states and their subdivisions on the basis of a fixed and fair share of surplus war commodities". The resolution was one of ten pertaining to the nation's road business, adopted at the four-day meeting of top highway officials from state highway departments, the Public Roads Administration, and insular territories.

The Association pointed out that the critical shortage of motor graders, tractors, scrapers, passenger cars, and both light and heavy-duty trucks is now making it necessary to defer much needed repair and rehabilitation accumulated during war years and aggravated since V-J Day. So serious has this problem grown that some states have abandoned snow removal in certain mountain passes and ceased much normal maintenance work, such as mowing, because of the lack of needed new equipment.

Fearing also that the present shortage of labor, engineering personnel, and materials may make it impossible to expend Federal-Aid funds within the time for availability, another resolution was adopted urging a 12-month extension of time during 1947, 1948, and 1949 for those funds appropriated under the Federal-Aid Highway Act of 1944.

The prompt appropriation of an existing balance of $3,000,000 authorized for Public Lands highways was asked. It was proposed that state highway departments be taken off the "special emergency" radio classification and given a more broadly defined permissible use of radio for all their operations by the Federal Communications Commission. It was urged that the Inter-American Highway to Panama be finished as soon as possible, with the available cooperation of Mexico and the several countries of Central America.

It was pointed out that questionable expenditures of public funds are now being made in connection with the construction of certain highway bridges over inland waterways. The cost of those bridges, influenced by rules and regulations of the Corps of Engineers, U. S. Army, in fixing both vertical and horizontal clearances, is not always consistent with the class of traffic to be served. A Bridge Committee report from the AASHO is to be transmitted to the Corps of Engineers and a resolution was made that this agency review its present policy with a view towards better serving the public interest.

New Officers Elected

C. W. Phillips, Highway Commissioner of Tennessee, was elevated from the post of First Vice President to that of President, succeeding M. J. Hoffmann of Minnesota. R. H. Baldock, State Highway Engineer of Oregon, was elected First Vice President.

Regional Vice Presidents elected were (1) Spencer Miller, Jr., New Jersey State Highway Commissioner; (2) F. Elgin Bayless, Chairman, Florida State Road Commission; (3) W. W. Polk, Chief Highway Engineer, Illinois; and (4) Clarence B. Shain, Director of Highways for the state of Washington.

Three new members of the Executive Committee of ten were elected. Ray H. Leavitt, Chairman of the Utah State Road Commission was elected to fill R. H. Baldock's unexpired term. C. H. Sells, Superintendent of Public Works of New York, and Fred R. White, Chief Engineer of the Iowa State Highway Commission, were also elected.

Leading Officials Speak

After Mayor Fletcher Bowron had welcomed the approximately 800 delegates to Los Angeles, President M. J. Hoffmann outlined the huge job facing the road builders and set the stage for discussions from which the resolutions were brought forth later. He pointed out that the $479,000,000 in construction contracts, let during the first eleven months of 1946, was approximately at pre-war level.

Commissioner of Public Roads Thomas H. MacDonald stressed the urgent necessity of eliminating traffic bottlenecks in urban areas, where through traffic must slow down to a snail's pace to crawl through cities and towns. Pointing out that "the traditional concept of highway improvements as public works that may be undertaken or deferred is fallacious in the extreme," MacDonald urged that the service of highways must be measured in terms of saving lives, of preserving property values, maintaining the essential services, and of sustaining major industries.

"October of this year produced the highest volume of traffic for that month ever recorded for the United States," MacDonald said. "As compared with 1945 volumes, traffic in the western United States is up 23 per cent, 25 per cent in the central region, 26 per cent in the eastern part of the country, and 30 per cent on main roads in California.

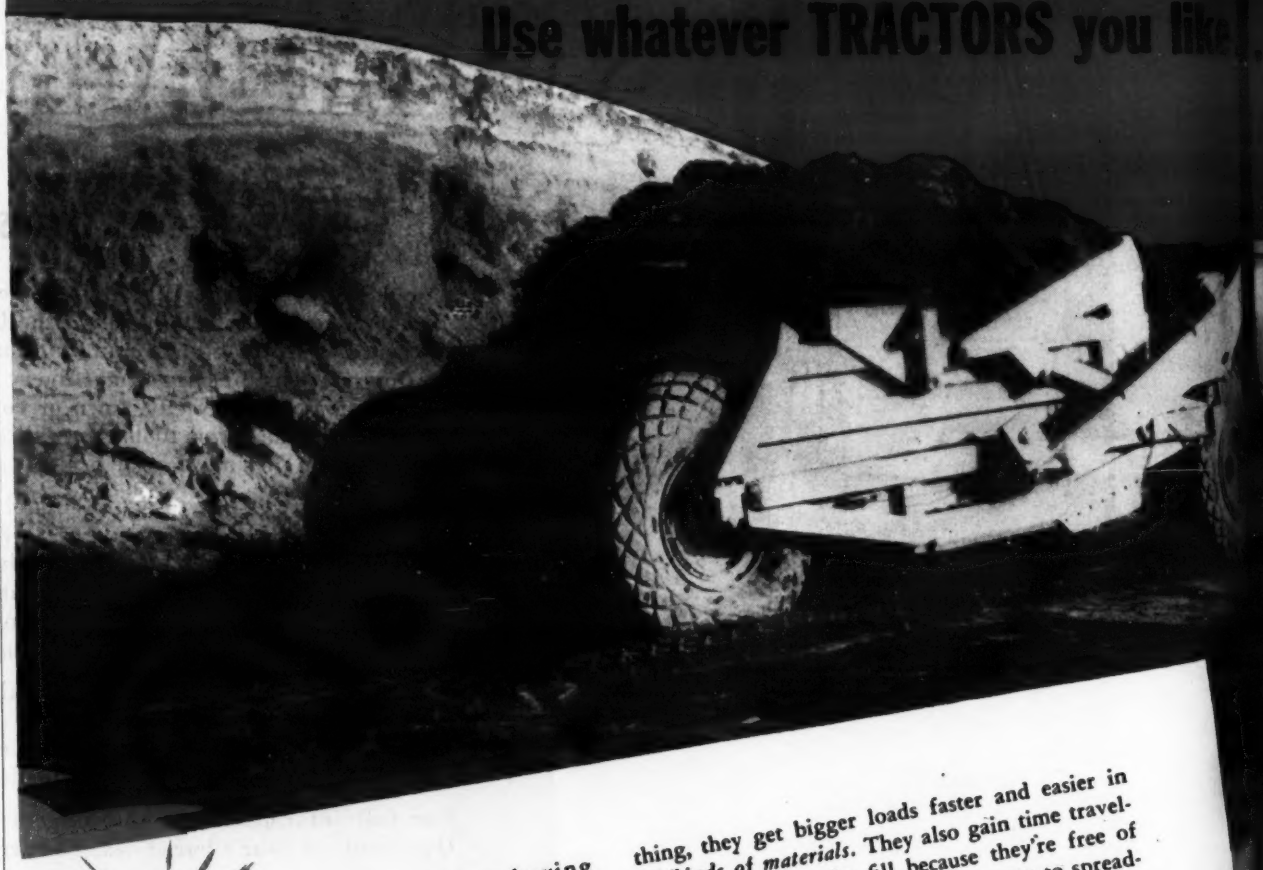
"Highways require continuing works of construction and maintenance that cannot be turned off and turned on, to accord with some theoretical concept of using each works to fill the gap if private employment lags," he added.

It was pointed out that 27,218 miles, or 14.5 per cent of the total Federal-Aid highway system requires reconstruction, based on a recent survey. This mileage has deteriorated with age and traffic, or the design is unsafe and obsolete. If that ratio holds on other state-

(*Continued on next page, Col. 4*)

PROFIT TIP . . .

Use whatever TRACTORS you like . . .



When it comes to buying tractor-scraper rigs, remember *it's the scraper that controls the "payload."* And as every experienced dirtmover knows, there's a big difference in the performance of various scrapers under varying job conditions. Moreover, a difference of only 5 yards per hour, figured over the operating life of a scraper, can easily mean 60,000 *yards of "pay dirt"—gained or lost—at your own bid price!*

That's why you'll find more and more smart dirt-movers buying their scrapers *entirely independent of the tractor* and holding out for job-proved LaPlant-Choate "Carrimors." Why LPC? Because operating records on hundreds of jobs prove conclusively that LaPlant-Choate rigs deliver *highest average production at lowest overall cost.* For one thing, they get bigger loads faster and easier in *all kinds of materials.* They also gain time traveling to and from the fill because they're free of costly dead weight. And when it comes to spreading—man, there isn't a scraper on the market that can match LaPlant-Choate *positive* forced ejection for cleaning the bowl in a hurry because *the apron moves ahead with the load*—no chance of jamming sticky or bulky material between the ejector and apron.

But that's only part of this interesting profit story. For complete facts call or write your nearest LaPlant-Choate dealer today. See him also for dependable repair parts and prompt, efficient service on your present LPC rigs. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa; 1022 77th Ave., Oakland 3, Calif.

LaPLANT-CHOATE

Positive FORCED EJECTION SCRAPERS

FIRST in Value because they're FIRST in Performance!

Four Engine Models Added to Diesel Line

Four new models of diesel engines have been announced by the Waukesha Motor Co., Waukesha, Wis. Already on the assembly line is the largest, the Model 6-WAKD. This unit, a 6-cylinder engine, is the size applicable to 2-yard shovels, draglines, hoists, mixers, crushers, and similar equipment requiring from 180 to 220 hp maximum.

The Model 148-DK is a 6-cylinder diesel and will develop up to 168 hp. The estimated power curve for automotive service extends up to 200 hp. The Model 190-DLB is claimed to develop over 60 hp in industrial service, with the maximum for automotive service 80 hp. The smallest of these engines, the 180-DLB, is said to develop just under 30 hp; no use other than industrial is expected for it.

All models are 6-cylinder except the 180-DLB, which is 4. The two smaller models have electric starting systems; the larger have either electric or gasoline starting systems.

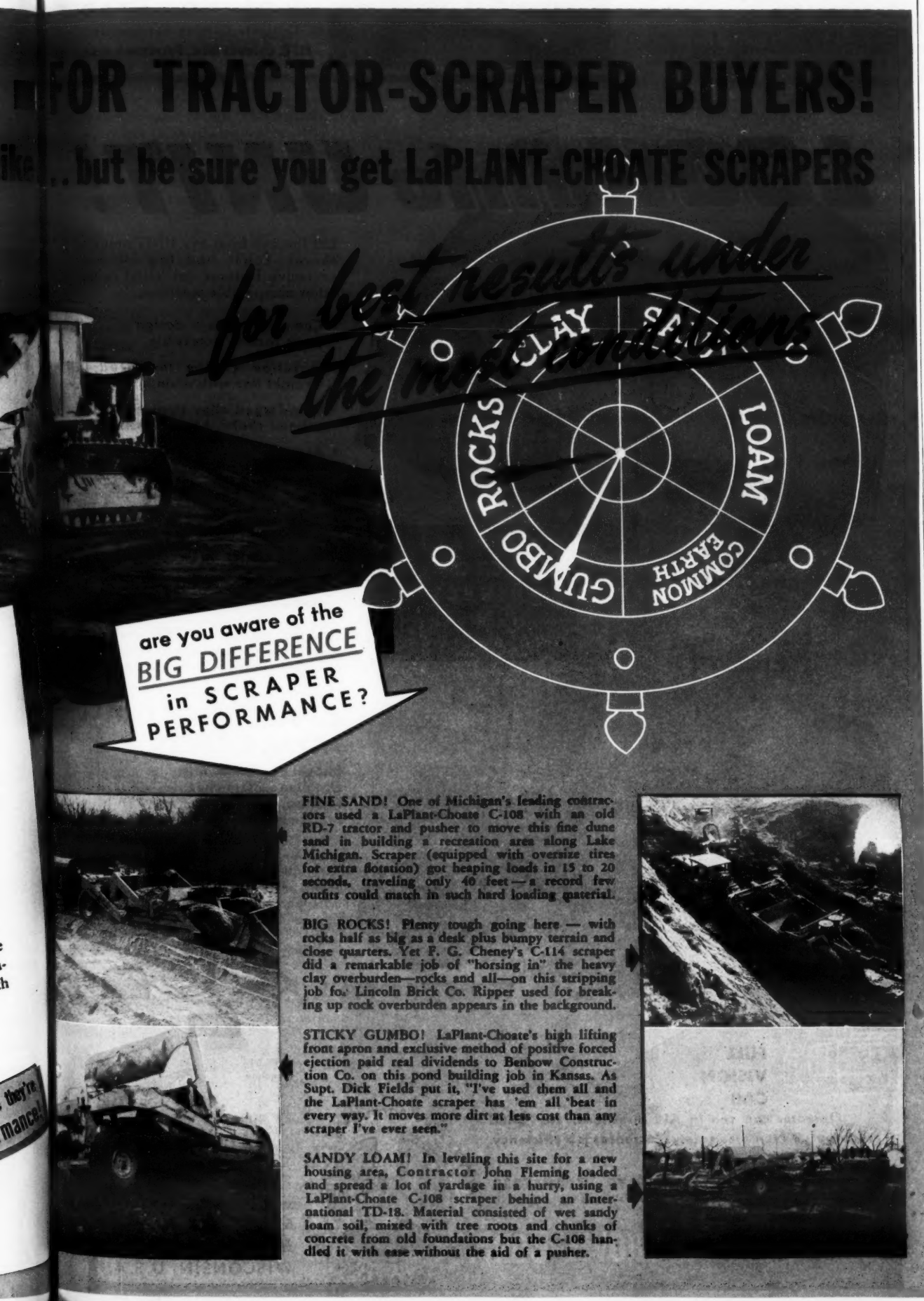
Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 6.

Lubrication-Maintenance Guide Reissued by Gulf

A complete guide for contractors and highway-department equipment engineers, discussing the care, maintenance, and lubrication of their machines, is available from the Gulf Oil Corp., 3800 Gulf Bldg., Pittsburgh 30, Pa. The first edition of 33,000 copies was quickly exhausted, and a revised second edition is now being distributed.

The book describes the care of the various parts of construction equipment, and also explains what each step recommended does, and the reasons for them. It also describes the proper lubrication procedures. The proper methods to follow to obtain maximum service from tires is also described in detail in this 72-page manual. The final chapter of the book deals with lubricating equipment and the lubricants made by the Gulf Oil Corp., for construction equipment.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 76.


FOR TRACTOR-SCRAPER BUYERS!
..but be sure you get LaPLANT-CHOATE SCRAPERS
for best results under the most adverse conditions
CLAY
LOAM
COMMON EARTH
GUMBO
ROCKS
are you aware of the BIG DIFFERENCE in SCRAPER PERFORMANCE?
FINE SAND! One of Michigan's leading contractors used a LaPlant-Choate C-108 with an old RD-7 tractor and pusher to move this fine dune sand in building a recreation area along Lake Michigan. Scraper (equipped with oversize tires for extra flotation) got heaping loads in 15 to 20 seconds, traveling only 40 feet—a record few outfits could match in such hard loading material.
BIG ROCKS! Plenty tough going here — with rocks half as big as a desk plus bumpy terrain and close quarters. Yet F. G. Cheney's C-114 scraper did a remarkable job of "horsing in" the heavy clay overburden—rocks and all—on this stripping job for Lincoln Brick Co. Ripper used for breaking up rock overburden appears in the background.
STICKY GUMBO! LaPlant-Choate's high lifting front apron and exclusive method of positive forced ejection paid real dividends to Benbow Construction Co. on this pond building job in Kansas. As Supt. Dick Fields put it, "I've used them all and the LaPlant-Choate scraper has 'em all 'beat in every way. It moves more dirt at less cost than any scraper I've ever seen."
SANDY LOAM! In leveling this site for a new housing area, Contractor John Fleming loaded and spread a lot of yardage in a hurry, using a LaPlant-Choate C-108 scraper behind an International TD-18. Material consisted of wet sandy loam soil, mixed with tree roots and chunks of concrete from old foundations but the C-108 handled it with ease without the aid of a pusher.

AASHO Annual Highway Meeting

(*Continued from preceding page*)

highway-department-maintained roads, there are 65,000 miles in need of reconstruction.

Major General Philip B. Fleming, Federal Works Administrator, urged in a prepared paper read by D. W. Greer of Texas that safety be the keynote of future highway design.

Of marked interest to the convention delegates was a report on the work performed in the state of California in 1946 by a highway study committee of the State Legislature, of which Senator Randolph Collier is Chairman. Its pattern may be followed in many states soon. After months of thorough detailed studies and state-wide hearings, the Collier Committee is reporting a comprehensive plan for the re-development of an adequate highway plan for California, which already ranks among the top highway systems in the nation.

The committee approached the problem of California main highways from the standpoint of a state-wide integrated network serving every section, predicating its findings on a long-range program. Highway officials in attendance voiced their hope that this far-reaching report will receive favorable action by the lawmakers.

Subjects under discussion by the officials included salaries, route numbering, bridges and structures, AGC-AASHO cooperation, planning and design policy, administration, maintenance and equipment, traffic engineering, road design, highway transport, international highway relations, publicity, materials, uniform accounting and legal affairs, road construction, right-of-way acquisition, radio, highway research activities, and state-wide planning surveys.

Current Maintenance Vital

Despite the all-important aspect of current construction contracts, delegates spoke again and again of the vital necessity of stepping up maintenance to meet the increasing traffic load. Pointing out that unless maintenance departments can hold highways from deteriorating under more and more vehicles, one delegate stated that the entire system of main highways may fall to pieces as a result.

A loose-leaf maintenance notebook containing all standard and new maintenance practices is being prepared and will soon be ready for issue to state highway department maintenance heads. As techniques become obsolete, new changes can be added to this booklet through the loose-leaf system.

Maintenance Engineer C. L. Motl of Minnesota suggested that state highway departments control the load limits on highways, and be granted the necessary authority to enforce its rules. Loading restrictions would vary, depending on the carrying capacity of slabs. Especially during the spring thaw when the frost leaves subgrades would Motl restrict heavy, frequent loads on highways.

Only nine states permit maintenance heads to sit in on the preliminary planning of a construction job. It was generally agreed that maintenance experience must be combined with future design if public money is to be spent wisely. It was suggested that maintenance engineers be given a chance to make recommendations on drainage, cut slopes, and alignment for snow removal. The engineers agreed that it is a good policy to "build maintenance in" to the job.

Full-width pervious blankets under slabs failed only 10 per cent of the time,

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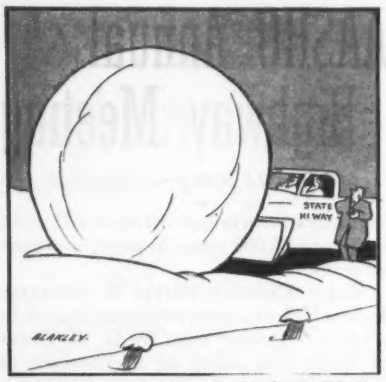


"What I want to know is, how did it get started in the first place?"

AASHO Meeting

(*Continued from preceding page*)

compared to 52 per cent failure in a gravel-drained embankment, it was said by one committee on drainage. Since a 12-inch sand blanket on a drained embankment has proved to be as strong as 4 inches of concrete, the maintenance delegates asked for more use of the pervious material wherever it is economically feasible.

Maintenance employees regard a state retirement plan as a definite inducement to stay on the payroll, studies of the Committee on Salaries showed, and 24 of the states now have some sort of retirement plan, 15 having adopted it since 1940. A wide difference of opinion exists as to the evaluation of different jobs. For instance, one state pays its maintenance mechanics $148 per month against $900 for the maintenance engineer, while another pays mechanics $228 and the maintenance engineer $330.

It was urged that the warning lights on snow-removal equipment be standardized to reduce accidents, and a flashing blue light was suggested. This would not compete with or duplicate the flashing red lights at railroad crossings where a full stop is mandatory.

Funds Are Pressing Need

It was decided that all future policy must be aimed at a comprehensive program and the funds with which to build its miles of new highways. How much the new Congress will affect the road-building program in its economy drive is still a moot question, but one which the engineers hope to take in stride when it arises.

Platform Trailer For Heavy Equipment

A platform trailer designed to carry heavy machinery for road and excavating contractors is manufactured by the W. C. Nabors Co., Mansfield, La. The machinery trailer features an 8-inch I-beam center frame which runs the entire length of the chassis, flooring of 2-inch oak, and closely spaced cross members and outriggers. Rub rails and stake pockets are standard equipment.

Self-loading models are furnished with rolled front and rear ends and with permanently anchored lift-cables out front. When the trailer is used with a completely rigged-out winch truck and semi-automatic fifth wheel, one man can load and move all equipment.

The trailers use an Austin socket-coupled fifth wheel. It is of the inverted type with trunnion bearings welded in the trailer frame to help prevent side-sway and to lower the center of gravity. The axle is rated at 16,000-pound capacity and uses Timken bearings. The recommended tire size is up to 10.00 x 20 duals. The company has available a 27,000-pound-capacity axle which has been designed specifically for severe load and road conditions.

The Nabors brakes use a 6 x ¾-inch molded brake-block lining; they are actuated by a constant-rise cam on a 1½-inch control shaft. The points of friction are mounted in Oilite self-lubricating bearings. The brakes may be powered by vacuum or straight air systems.

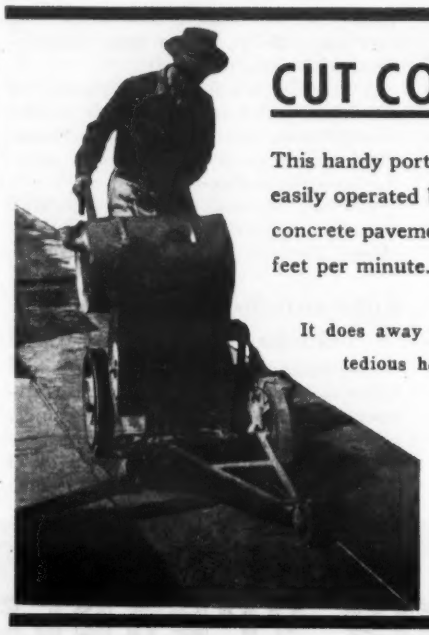
Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 12.

Small-Bridge Booklet

A booklet containing general bridge-building data has been made available by the Toncan Culvert Manufacturers Association, Film Bldg., E. 21st St. and Payne Ave., Cleveland 14, Ohio.

The booklet contains detailed charts and tables of the dimensions and design properties of Toncan iron sectional plate pipe and arches. It also contains numerous illustrations and descriptions of applications of Toncan iron drainage products to small bridge design.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 77.



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It does away with costly pneumatic hammering or tedious hand-chiseling, on smaller jobs.

Makes a good clean cut.

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Lift the cab from any UNIT crane or shovel. You'll find the following exclusive features not found in any other comparable machine:

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Shovel . . . Clamshell . . . Dragline . . . Trenchoe . . . Magnet . . . Pile Driver . . . Back Filler.

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Operator can see in ALL directions. No "blind spots". Promotes safety. Increases job efficiency.

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A 4868-1PCR-2

Highway Snow Removed With Combined Forces

Done Both by Maintenance Crews and Contractors in State Where It Snows in All but Two Months

WAY down east in Maine is also pretty far north. And a lot of winter comes there every year—in fact, almost all the year except the months of July and August, if the record of snowfalls is any criterion of the presence of winter. In the Pine Tree State snows are not confined to the calendar period of winter, which begins on December 21 and ends with the advent of spring on March 21. Parts of Maine always see snow in September. In May, 1945, the capital at Augusta was covered by a foot of the white stuff that sets highway maintenance engineers to cursing, not always under their breath. And Augusta is located in southern Maine. The latest available statistics, which averaged precipitation at four different locations over the state, reveal an annual snowfall of 95.8 inches.

To keep the highways properly cleared of this beautiful but obstructing blanket of white, the Maine State Highway Commission uses its own maintenance employees working with state-owned equipment. It also gives contracts to individual truckers or contractors to clear certain sections of road with their own snow-removal equipment. In addition, a large amount of highway mileage is plowed by the towns using their own forces and equipment. In this work they are aided financially by the State to the extent of $50 per mile per year, or about half of the actual cost of removing the snow. Where this winter maintenance is done by the State, the towns are assessed $40 per mile per season; the balance of the cost is contributed by the Highway Commission.

Plowing by Contract

The State itself is responsible for clearing snow and ice from 2,813.6 miles of its principal highways. These are scattered over 33,215 square miles of area, most of which is heavily wooded. As this mileage is so widely dispersed, the Commission does not have enough employees or equipment of its own to handle the task. So it has awarded contracts for snow removal on 1,425 miles of its highways.

Last year 58 different contracts were given on this work to truckers or small contractors. The average section allotted to a contract is 24 miles long. The individual or company which is awarded the work must first show the Commission that it has the equipment necessary to fulfill its contract. In addition, the contractor agrees to supply any other equipment which the Commission requires for the proper removal of the snow. Contracts extend from November 1 to May 1.

In Aroostook County, which occupies the northern tip of the state whence come the big potatoes, the State could find no contractors to handle any of the snow plowing. So this area is maintained entirely by maintenance crews of the Commission. Here the State employs its heavy equipment. This includes 25 trucks of 6 to 8-ton size, fitted out with heavy-duty V-plows, and a Snogo rotary plow which is generally used to throw the snow off the shoulders into the ditches after the V-plows have passed. The equipment is stored in a state garage at Caribou, one of three in the state. The other two are located at Augusta and Scarboro; the latter town is situated along the southeastern coast line.

Besides these garages, the State has other storage space for plows and trucks placed throughout the state at strategic locations where they can swing into action at a moment's notice. Where the rate of snowfall is comparatively light, such as along the coast, most of the plowing is done with 1½-ton trucks equipped with straight-blade plows.

The contract work covers only the removal of snow, as all sanding and salting operations are done entirely by the maintenance groups. No standard price is quoted in these contracts since the costs vary according to the conditions which can be expected in the different localities. The Commission is gradually trying to build up its fleet of equipment and to increase its personnel so that eventually all the removal of

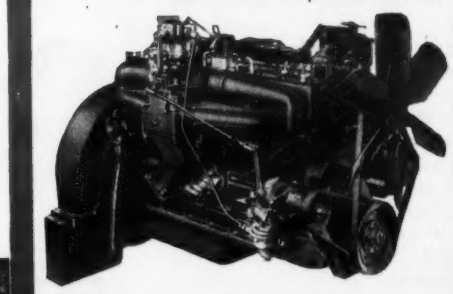
(Concluded on next page)

HOT or COLD Mix Asphalt

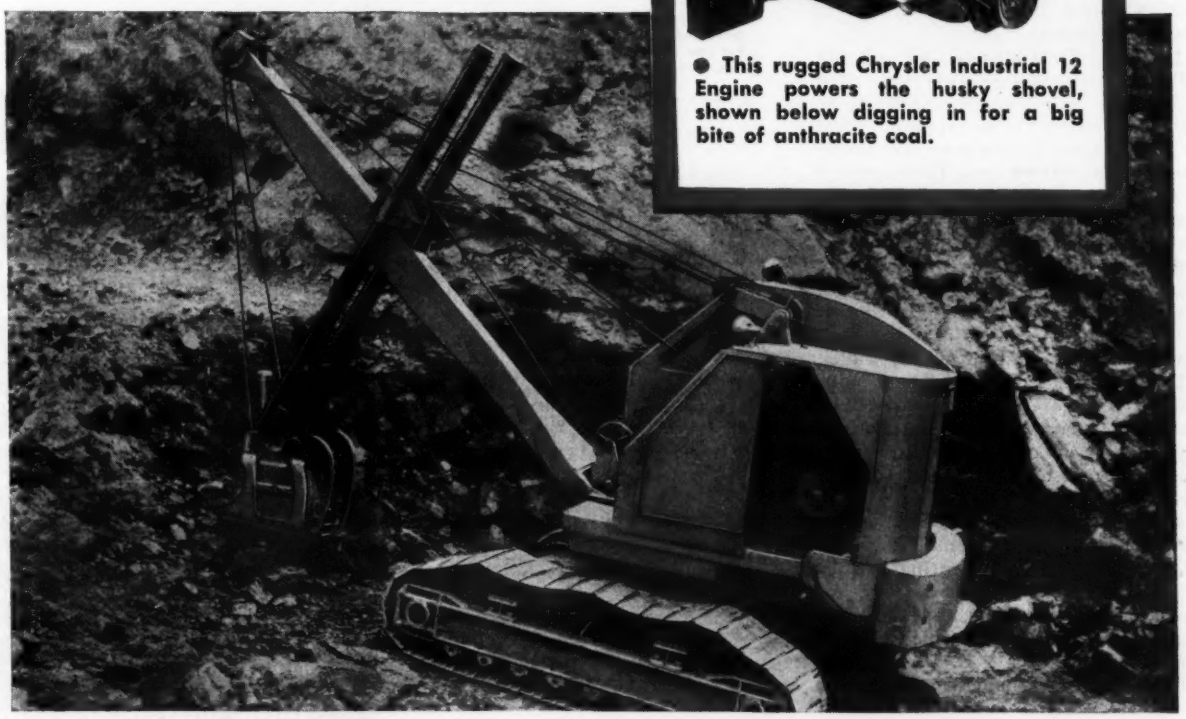
DEPENDABLE

THE SIMPLICITY SYSTEM COMPANY
CHATTANOOGA, TENNESSEE, U.S.A.

It Takes a Rugged Engine for the Tough Jobs



● This rugged Chrysler Industrial 12 Engine powers the husky shovel, shown below digging in for a big bite of anthracite coal.



CHRYSLER Industrial Engines are built for the tough jobs. They have proven their stamina—and economy, too—in shovels, cranes, pumps, tractors, motor coaches and many other applications.

Chrysler standards of precision, quality and performance have made these engines great. Their increasing popularity among industrial power users is proof of their ability to deliver dependable low cost power.

Superfinished parts, ease of servicing—coupled with nation-wide parts availability—assure powered-equipment operators maximum work hours.

Write the Chrysler Industrial Engine Division for help in solving your power problems.

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12201 East Jefferson, Detroit 31, Michigan

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Address_____

City_____ State_____

Highway Snow Removed With Combined Forces

(*Continued from preceding page*)

snow will be done by state forces. During the war period labor was extremely scarce, and it still remains so in Maine. As a result, snow-removal contracts may still be in effect for some time.

The really heavy highway mileage in Maine is on the secondary road system where 11,658.3 miles are plowed through a combination of state-aid, town-aid, and local municipalities. The bulk of this snow removal is done with town-owned equipment. The latest summing up of the total amount of equipment used in this work, including state, town, and contractor-owned property, shows that 210 tractors and 1,130 trucks with plows were needed last year to keep the roads open.

Preparations for Snow

Early in the autumn, snow fence is erected totaling 1,550,000 linear feet on the state highway system, and 3,900,000 linear feet on the state-aid and town roads.

The placing of sand piles along the roadway is done on a big scale, with power shovels working in the sand pits. Trucks carry the material to important locations, especially on curves and hills. When the sand is being stockpiled, salt is added as an anti-freeze to keep it from hardening into a solid heap when the cold weather comes; and more salt is added through the winter if deemed necessary.

Last year 3,000 tons of rock salt and 320 tons of calcium chloride were used in winter maintenance. They were either added to the stockpiles of sand or applied directly to the ice and hard-packed snow on the road. The objective is to keep at least 7 feet of pavement exposed down the middle of the highway along with the full-width plowing. This center strip of bare surface enables motorists to keep two wheels of their cars on the pavement even when passing each other; thus it adds a certain measure of safety to winter travel.

The maintenance department also shifts its summer-time "tar crews" from their tent quarters to heated houses, which are rented at well distributed points to serve as headquarters during the winter operations. The Commission has 25 of these units, each having a crew of from 10 to 14 men. They work all over the state from spring to fall, surface-treating the roads as they go. Then they live in tents and eat their meals in a kitchen trailer which accompanies them (see C. & E. M., January 1947, pg. 100). When winter comes, these state-owned camps are folded away. The men are given more solid quarters where they live while carrying on the sanding or plowing operations connected with winter maintenance of the road system. Most of these men are regular full-time maintenance-department employees.

In sanding an icy road, they use the same spinner disks at the rear of the trucks as are employed in spreading sand over a tar application in connection with a surface treatment. The Commission also exercises supervision over these operations when they are done by local authorities on the secondary roads.

Organization

For the greatest efficiency in snow removal, the state is divided into 40 districts. Each covers about an equal mileage of roads to be plowed. The districts are headed by supervisors who control all operations in that area, whether they be state or town maintenance forces or crews of the contractors. Exercising general supervision over these district supervisors are four division supervisors. They, in turn, report to the Superintendent of Maintenance and his assistant. The two latter officials also look after the progress in the five districts centering around Augusta which are not included in the jurisdiction of the division supervisors.

The district supervisors are responsible for the removal of snow in their districts. Being right on the job, they are aware of the local weather conditions and give the signal to the maintenance and contractors' crews when they should start plowing. This is done when 2 to 3 inches of snow is on the road, whether that occurs from a fall or from drifting. The aim of the Commission is to maintain a roadway wide enough for two-way traffic during a snow storm, and after the snow has ceased, falling to clear the shoulders back to their full width. The progress in snow removal is carefully followed from the central office in Augusta, from which point general orders are issued pertaining to the work.

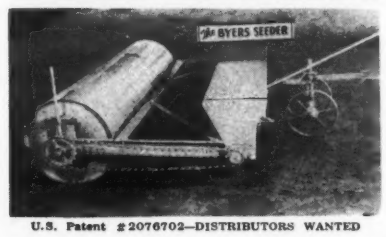
The Maine State Highway Commission is headed by Lucius D. Barrows, with John B. Church, Superintendent of Maintenance, assisted by J. W. Dority.

FWD Sales Appointments

The appointment of two new sales managers has been announced by The Four Wheel Drive Auto Co., Clintonville, Wis. The new Zone Sales Manager for the states of Tennessee, Alabama, Florida, Georgia, South Carolina, and North Carolina will be A. R. Krug. Mr. Krug was formerly Assistant Sales Promotion Manager at FWD.

William C. Merrill will be the Zone Sales Manager for the states of Texas, Oklahoma, Arkansas, Louisiana, and Mississippi. Mr. Merrill has been District Sales Supervisor in the territory, with headquarters at Duncan, Okla.

THE BYERS SEEDER



U.S. Patent #2076702—DISTRIBUTORS WANTED

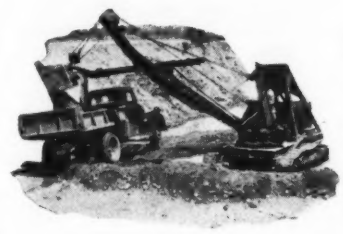
Seeds, Rakes and Rolls in One Operation.

It will sow grass seed, commercial fertilizer, limestone or any granular material that can be broadcast on the surface of the ground and raked in.

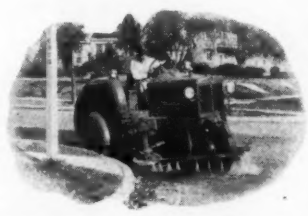
P. L. BYERS
Clyde Ohio

"99-H" POWER GRADER—Exclusive All-Wheel Drive and All-Wheel Steer plus High-Lift Blade, Extreme Blade Reach and Completely Reversible Blade guarantee superlative performance on every job.

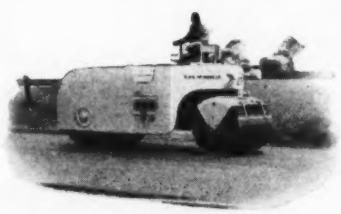
NO. 55 MOTOR GRADER—Engineered to handle a wide variety of maintenance and light grading jobs quickly, easily, and economically. May be had with scarifier attachment.



BADGER SHOVEL—Convertible to crane, dragline, piledriver, trench hoe, and skimmer. ¾-swing design has many operating advantages.



MODEL "40" PATROL SWEEPER—Available with right-hand or left-hand gutter broom, or both. Rear broom throws dirt directly into hopper. May be had with Leaf Broom attachment.



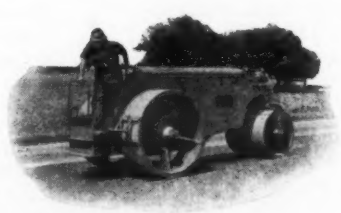
TANDEM ROLLERS—Made in 2 sizes—5 to 8-Ton and 8 to 10½-Ton. The variable weight feature enables one machine to handle a wide variety of work.

BUILT to OUTPERFORM

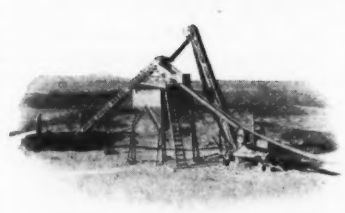
"Plus values" built into every Austin-Western machine . . . exclusive features that save time and money by getting the job done better and quicker . . . engineering experience dating back to the first crude Austin-Western tools of 1859, culminating in the new Power Grader and Street Sweeper models shown on this page, and other new models not yet in production.

Your nearby A-W Distributor is an especially good man to know in these days of postwar changes and developments.

AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS, U. S. A.



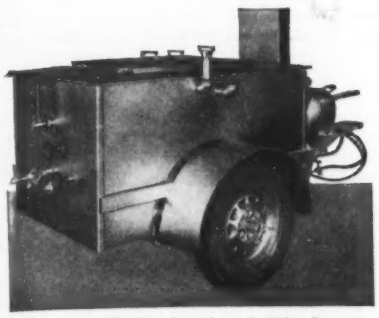
3-WHEELED ROLLERS—Made in sizes ranging from 6 to 12 tons. Gasoline or diesel engines. Hydraulic power steer. Hydraulic scarifier attachment.



PORTABLE CRUSHING PLANTS—Range in size from that illustrated to the magnificent Triple Unit Plant with its Primary, Secondary and Reduction Crushers.

STATIONARY CRUSHING PLANTS—Engineered to meet individual requirements; employing any desired combination of Crushers, Conveyors, Screens and Bins.

BUILDERS OF ROAD MACHINERY
Austin-Western
SINCE 1859



The new White heating kettle has a double-boiler design for handling rubberized-asphaltic compounds adversely affected by direct heat.

New Type of Kettle For Joint Compound

The use of bituminous joint fillers which contain rubber or other ingredients adversely affected by coking or directly applied heat has resulted in the development of a double-boiler type of melting kettle. One such kettle is the Model F-10, made by the White Mfg. Co., 1227 W. Beardsley Ave., Elkhart, Ind.

This unit has an inner kettle containing the filler compound. It is surrounded by an outer kettle containing a heat-transferring agent, such as special oil. The two kettles are mounted in regular kettle housing, completely insulated by asbestos. Two White kerosene burners are furnished for rapid starting. The oil is raised to 500 degrees in from 30 to 45 minutes, White says, and then heat is maintained with one burner. The oil can be heated to any temperature up to its flash point of 750 degrees.

The compound in the inner kettle gradually rises to proper temperature without the hazard of coking or overheating. It has an exacting thermal character; it melts at 375 degrees and it must not exceed 425 degrees. It requires about 6 hours to reach 400 degrees, its correct consistency for pouring.

The inner kettle is divided by a screen into two sections. During operations, fresh compound can be added to the front section to melt and flow through to the rear section. A screen prevents the passage of semi-molten material to obstruct the kettle outlet. In the rear compartment of the compound kettle is a hand-operated paddle-type agitator for stirring the compound. This moves through 160 degrees. Because of the heavy viscosity of this type of compound, especially prior to its critical melting point of 375 degrees, a motor-operated agitator is considered unwise.

Each kettle is provided with two bimetal dial thermometers read from the rear of the unit, with suitable temperature ranges for the necessary heats used in each kettle.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 13.

International Harvester Announces Sales Changes

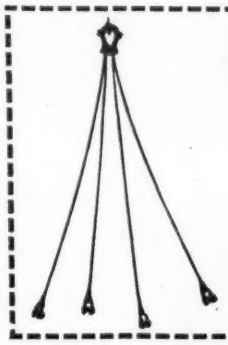
The opening of four separate motor-truck branches has been announced by the Motor-Truck Division of the International Harvester Co., Chicago, Ill.

The new branches are at Columbus, Ohio; Fort Wayne, Ind.; Little Rock, Ark.; and Davenport, Iowa. The Columbus branch will be under the managership of J. L. Teach, formerly assistant branch manager at New York. The Fort Wayne branch will be directed by W. J. McCahill who held the same position at Pittsburgh. H. H. Hedges, Jr., will head the Little Rock branch. Mr. Hedges formerly was assistant branch manager at St. Louis. The Davenport office will be headed by C. E. Cheney, who is being transferred from a similar position in Davenport.

In addition to the establishment of the new motor-truck branches, the following changes in truck branch management have also been announced. W. A. Shanahan, formerly assistant manager, Pittsburgh, has been appointed branch manager there; E. M. Moore, assistant motor-truck manager at Houston, Texas, has been transferred to St. Louis, Mo., in the same capacity; P. C. Johnson, assistant branch manager at Oklahoma City, has been transferred to Houston; E. E. Krogstad, assistant branch manager at Tulsa, Okla., will serve in that capacity at Oklahoma City; T. E. Aughinbaugh, formerly retail motor-truck manager at Denver, Colo., has been appointed assistant motor-truck branch manager at Detroit; W. E. Greene, assistant manager, New Orleans, has been made branch manager there; Henry N. Baker, blockman at Memphis, has been appointed assistant manager at that branch; F. B. Jennings, assistant manager, Dallas, has been transferred to the San Francisco motor-truck branch as assistant manager; W. G. O'Neill, retail motor-truck manager, Columbus, has been transferred to Pittsburgh as assistant manager; B. H. Crawford, retail motor-truck manager, Los Angeles, has been promoted to assistant manager, Kansas City motor-truck branch; R. C. Burns, retail motor-truck manager, Philadelphia, was transferred to the New York motor-truck branch, as assistant manager; P. E. Thomas, retail motor-truck manager at Lexington, Ky., has been made assistant manager, Parkersburg, W. Va.

Glenn & Sons Appointed

The appointment of Joseph Glenn & Sons, Clifton Heights, Pa., as distributor in the Philadelphia area, has been announced by the Manhattan Rubber Division of Raybestos-Manhattan, Inc., Passaic, N. J. The Glenn organization will carry a stock of conveyor belts, power-transmission belts, V-belts, and hose of all types.



WIRE ROPE SLINGS

1⅛" diameter, 6x19 galvanized improved Plow steel cables. Overall length, 12' 6"; cable length 11' 4". Complete with fittings as shown. This War Surplus is offered at a fraction of its original cost.

BROWN-STRAUSS CORP.

1410 Guinotte Ave. Kansas City, Mo.

We were behind the 8-ball until...

We were going crazy on this big housing project. An old building had been razed, and it was our job to get the debris out of there but *fast!* Hard as we worked, we just couldn't seem to stay on schedule.

I'd probably be a gibbering idiot if our Oliver "Cletrac" dealer hadn't happened to drive out. "Why not put a Sargent OVERHEAD on that Cletrac of yours?" he grinned. "Then you can back up to that mess, get a load, and pull straight up to your truck, without turning, and dump the load. You'll save enough time to catch up to schedule. I've got an OVERHEAD in my place now. Send in your tractor, and my boys will mount it tonight."

Well to cut the story short, that's just what I did, and we not only caught up to schedule, we beat it! That quick service certainly got us out from behind the eight-ball. The Oliver "Cletrac" dealer is a good guy to know.

Cletrac

a product of

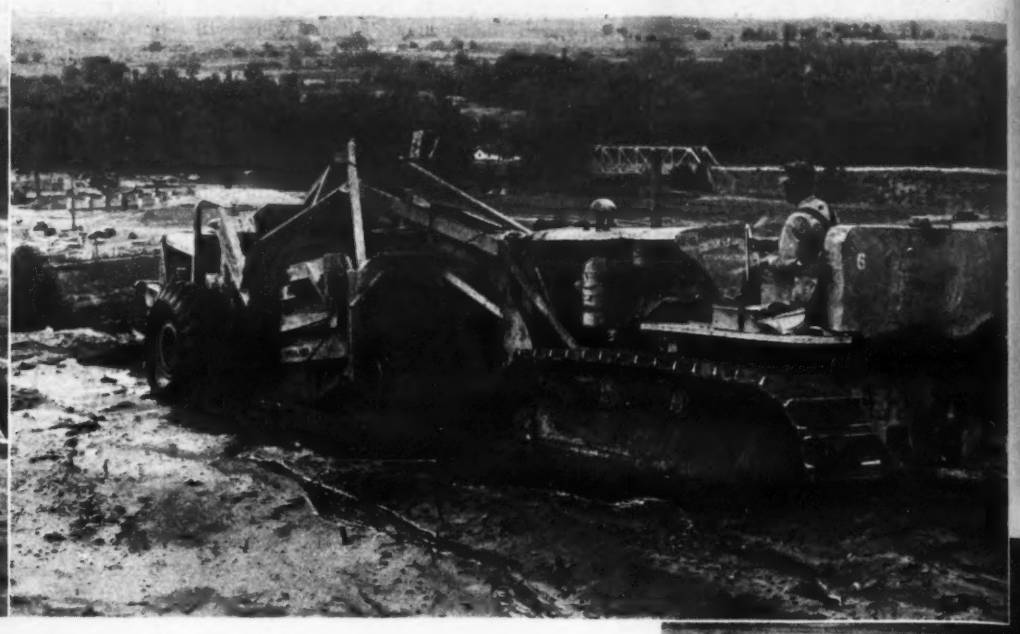
The OLIVER Corporation

OLIVER Cletrac SALES SERVICE

"THE SIGN OF EXTRA SERVICE"

AT THE PIT. Water for the fill material was added at the borrow pit. At left, one of the two men assigned to this job handles the 1½-inch hose which was connected to the main 3-inch line carrying water to the top of the hill.

LOADING. Earth for the compacted embankments on the Gibbons & Reed job came from a near-by hilltop across the railroad tracks, and was hauled by a fleet of Tournapulls. Below, a Caterpillar D8 tractor aids in loading. The average round trip was 3,200 feet—a 1,400-foot haul and 1,800-foot return—and the six Tournapulls averaged 350 cubic yards an hour.

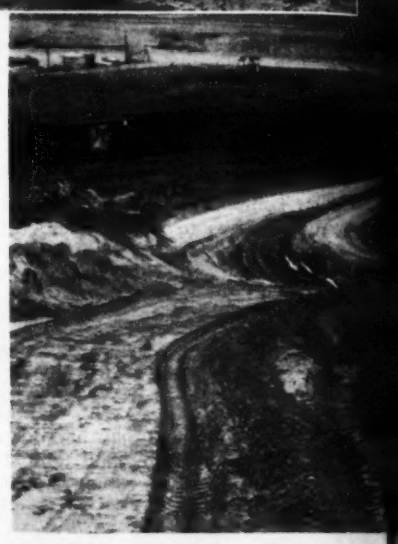


Overpass Project Will Increase Road Safety

A $450,000 Job Near Ogden, Utah, Includes Structures to Carry Highway Over River and Railroad, and 170,000 Yards of Rolled-Earth Fill

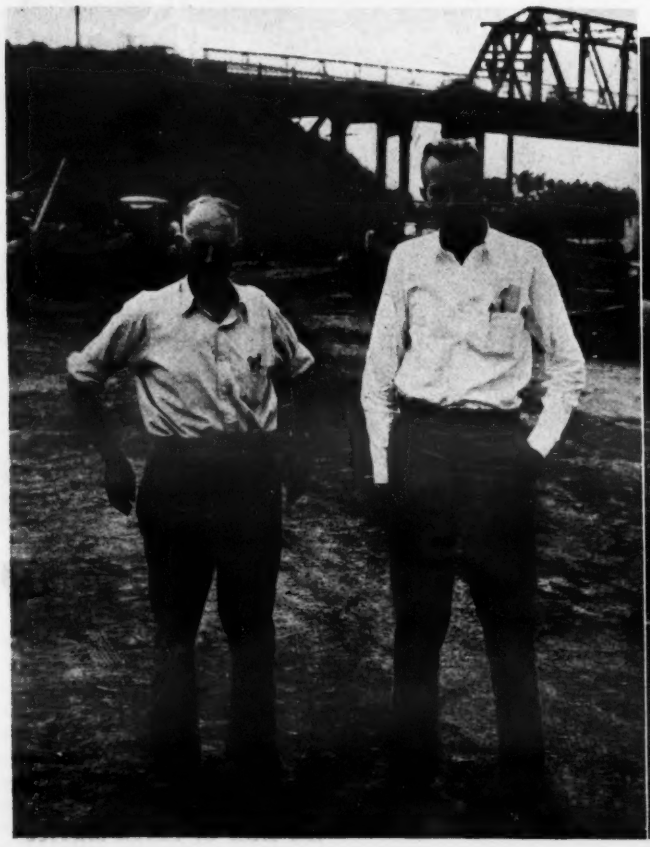
(*See article on page* 53)

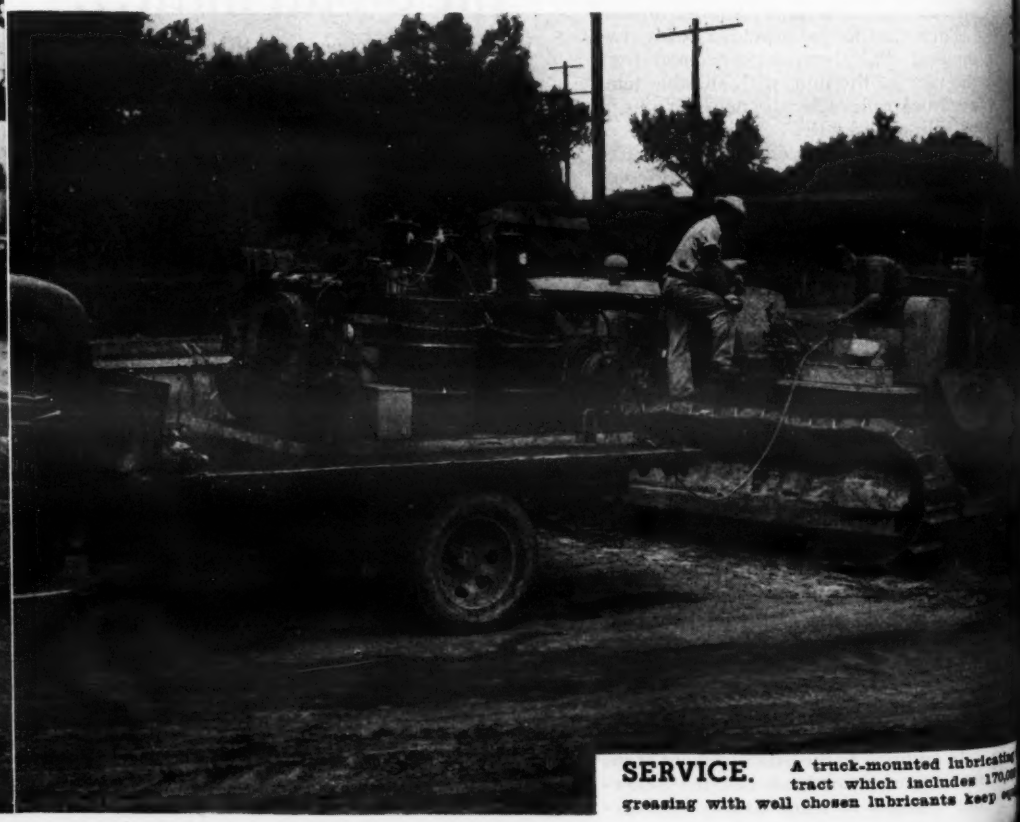
C. & E. M. Photos



DOWN GRADE. The loaded Tournapulls went down a steep graveled haul road, made a 150-foot-radius turn at the foot of the hill, and crossed the railroad tracks. Daily dressing and sprinkling kept the access road in good condition for safe efficient operation of the equipment.

IN CHARGE. Fred Miles, at left below, is Resident Engineer for the Utah State Road Commission on this $450,000 grade-separation and bridge contract. In charge for the contractor, the Gibbons & Reed Co. of Salt Lake City, is Superintendent W. E. Swanson, at right below.

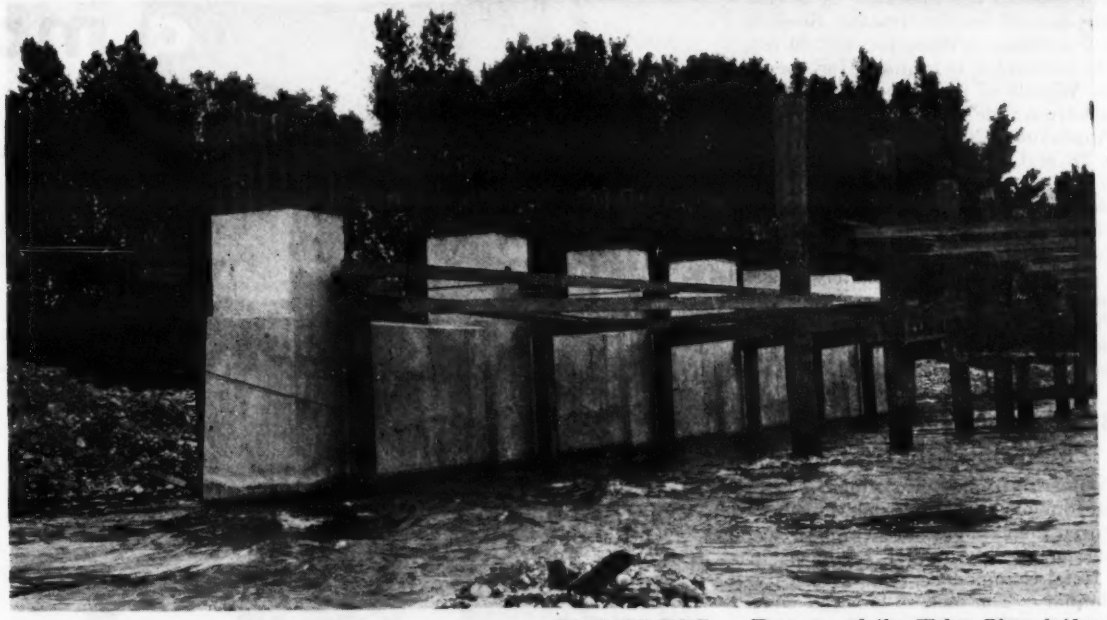




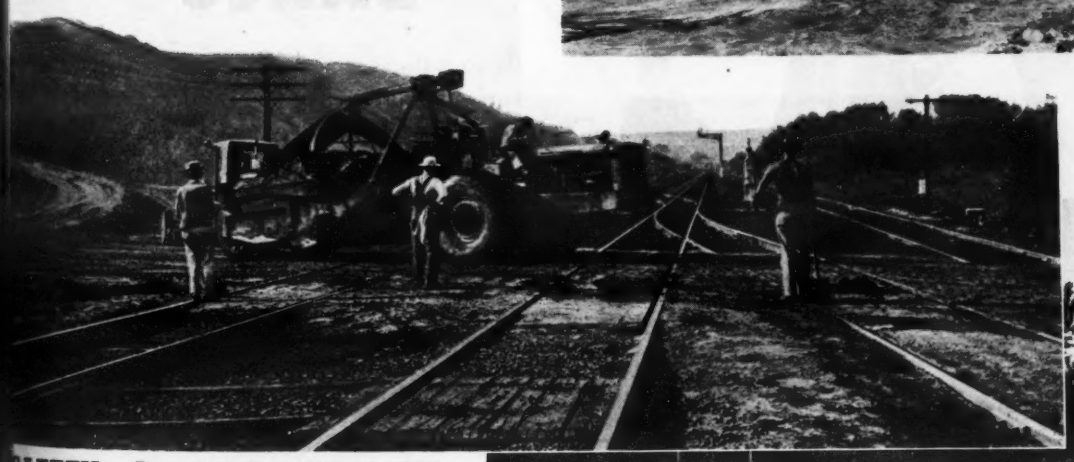
SERVICE. A truck-mounted lubricating tract which includes 170,0 greasing with well chosen lubricants keep eq

DIVERSION. Seven Armco 36-inch corrugated-metal pipes were laid in the stream bed and a dirt and gravel service road built over the pipe, as shown above. Then an earth and rock cofferdam was built to divert the Weber River into approximately half its normal stream bed while two piers for the bridge were built. The river water was then returned to this half of its course, while the third river pier was constructed.

PILE DRIVING. The piers of the 4-span 222-foot reinforced-concrete T-beam bridge to carry U. S. Highway 91 over the Weber River, near Ogden, Utah, rest on 30-foot wood piles driven to a bearing of 60 tons. Treated-timber piles, 40 feet in length and driven to the same bearing, support the abutments. Below, a Rex 4-inch pump unwaters a pier site while pile driving is in progress.



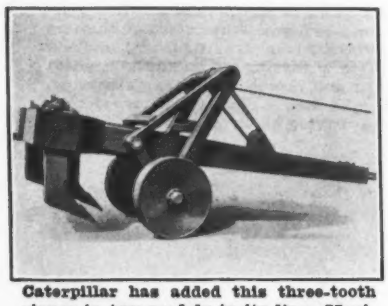
PROGRESS. Here one of the Weber River bridge piers rises from the stream bed. The hooked reinforcing bars are sticking up for the next pour. The wood-pile falsework, driven at the same time as the pier piles, will carry deck forms later on in the work.



SAFETY. To protect the equipment which had to cross the heavily traveled railroad tracks on its frequent trips to and from the borrow pit, a railroad conductor and brakeman, paid by the contractor, were stationed at the crossing to flag the Tournapulls. The man with the shovel removed spilled dirt from the tracks.

ON THE FILL. At least 90 per cent of optimum density was required for the embankments on this project. Dumped in layers less than 6 inches thick, the earth was dressed by bulldozer or grader, and thoroughly compacted, as shown at right. Six to eight La-Plant-Choate sheepfoot rollers, pulled by a D8, worked continuously as the dirt was placed.

serves the equipment on this Gibbons & Reed con-
yards of rolled-earth fill. Regular servicing and
performing efficiently on any job.



Caterpillar has added this three-tooth ripper in two models to its line. Maximum penetration for one is 28 inches; for the other it is 30 inches.

Three-Tooth Ripper Built in Two Sizes

Production of two sizes of cable-operated rippers has increased the earth-moving equipment line of Caterpillar Tractor Co., Peoria 8, Ill. The No. 28 is built for use with one or two D8 tractors, the No. 18 for use with a single D7 or D8 tractor.

Both models are equipped with three teeth which are detachable should less than that number be required on the job. Replaceable tips of the teeth are of heat-treated alloy. Maximum depths of penetration are 28 inches for the No. 18, and 30 inches for the No. 28. And the company states that accurate control permits the operator to rip material to any depth up to the maximum. Tooth angle and weight distribution are said to give penetration on the hardest materials.

The rippers are operated by a rear cable control on the tractor. Sheaves are 9¾ inches in diameter, and 80 feet of ½-inch cable is required for operation. Wheels of the rippers are of the steel-drum type.

Approximate shipping weights of the No. 28 and No. 18 models are 13,000 and 9,500 respectively. Removable cover plates are provided in the frames; they permit filling with sand or other materials to increase the operating weight of each model approximately 2,200 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 14.

ASCE Confers Honorary Membership Upon Four

Conferring of honorary membership upon four of its distinguished members featured the 94th annual meeting of the American Society of Civil Engineers in the Hotel Commodore, New York City, in January. The men so honored were Albert P. Greensfelder, Charles B. Burdick, LeRoy K. Sherman, and A. W. K. Billings.

Mr. Greensfelder is a St. Louis contractor and civic leader. He has had a distinguished career as a planner and builder of important projects in that and other cities.

Mr. Burdick is a Chicago consulting engineer who has done water-supply, flood-relief, and sewerage-problem work for many years. Mr. Sherman is the originator of the unit hydrograph, a principle that has been the basis for the design of many important dams. Mr. Billings is a retired President of the Brazilian Traction, Light & Power Co.; he was recently awarded the Brazilian Government's National Order of the Southern Cross.

Eye-Safety Booklet On Hazards, Equipment

A new safety guide which lists industrial eye hazards by industries and recommends the proper equipment for protection is announced by American Optical Co., Southbridge, Mass.

Some of the eye-hazardous jobs listed include acetylene burning and cutting, acetylene welding, electric welding, spot welding, furnace operation, babbitting, chipping, grinding; operating manual and power-driven hand tools, machine-shop tools, and woodworking machinery; working with or adjacent to electric welding; working with or handling molten metals; and working with chemicals, compressed air, and dusts.

The guide contains descriptions and pictures of the equipment that should be worn for complete eye protection for these jobs.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 78.

Eighmy Names Sales Head

The appointment of Harry R. Conn as Sales Manager to succeed J. B. Beatty, who resigned, has been announced by Eighmy Equipment Co., 526 W. State St., Rockford, Ill. Mr. Conn goes to Eighmy from R. G. LeTourneau, Inc., where he held the position of Eastern Sales Manager.

Eighmy Equipment Co. handles a complete line of construction equipment including Link-Belt, LaPlant-Choate, and others.

A Roller For Every Job

Sturdy, heavy-duty rollers, engineered to stand up under the toughest conditions. Pierce-Bear Tandem Rollers are powered by economical Allis-Chalmers 4-cylinder industrial type gasoline engines. Variable weights, from 3½ to 5 tons with built-in water tanks for ballast and wet rolling.

Pierce Baby Bear 2½-3 tons

Pierce Medium Bear 3½-5 tons

The new 2½-3-ton Pierce Baby Bear is designed for close-in work and small area maintenance. It works against a curb up to 25 inches high and within 1½ inches of a higher wall or building. Final drive is within the rear roll. Use Pierce-Bear Tandem Rollers for all-around performance. Write for folder.

Pierce-Bear Rollers

Lewis Manufacturing Company

415 Hoefgen Avenue—San Antonio 6, Texas

a man's a

giant

with a

BARCO

Barco is the accepted tool on thousands of hurry-up jobs all over the world. Foremen know that a worker gets powerful muscles of steel when you team him with a Barco Portable Gasoline Hammer. He works harder and faster with this tireless tool. The toughest going—even in hard-to-reach spots—becomes easy. Eleven special attachments make a Barco useful on dozens of *different* jobs.

BREAKING • DRILLING • DRIVING • TAMPING

BARCO

PORTABLE GASOLINE HAMMERS

FREE ENTERPRISE—THE CORNERSTONE OF AMERICAN PROSPERITY

BARCO MANUFACTURING CO., NOT INC., 1818 WINNEMAC AVENUE, CHICAGO 40, ILLINOIS

IN CANADA: THE HOLDEN CO., LTD., MONTREAL, CANADA

Sealed Crushed Rock Replaces Rural Road

Bituminous Seal Coat on Selected Crushed-Rock Base Course Improves Old Gravel Highway

(*Photo on page* 1)

A NEW type of high-speed bituminous highway is currently under construction by contract with the Missouri State Highway Department. Designed with an eye for future armor coating, the new road will supplant sections of graded gravel which heavier traffic has made obsolete. It will have a select crushed-rock base 6 inches thick, a prime coat of MC asphalt, and a seal coat of high-penetration asphalt and rock chips or pea gravel.

One of the first of these projects was begun on State Route 28 between Belle and Owensville in Missouri, June 24, 1946, by the Porter-DeWitt Construction Co. of Poplar Bluff under a $235,500 State Highway Department contract. Now completed, the 12-mile section, 22 feet wide, will help to speed local traffic over the state route.

The new job involved the quarrying and processing of 60,000 tons of limestone, and the excavation and grading of about 75,000 cubic yards of unclassified earth. The contract price of $1.69 per ton for limestone included drilling, shooting, crushing, and hauling the material to the road. Porter-DeWitt bid $1,500 per mile for watering and rolling this crushed rock, and for the final dressing just ahead of priming.

Grading

Approximately half of the new road had already been graded several years ago, and on this section the only dirt-moving necessary was the re-shaping of a crown. This was done by one of three Caterpillar No. 12 motor graders on the job.

For the heavier excavation in clay, rock, and loam, Porter-DeWitt used part of a fleet of heavy equipment which had finished a job at Hayti, Mo. Three LeTourneau Super C Tournapulls were brought in and used on earth hauls not over 1,500 feet long. Average hauls were 800 feet, with dirt quantities balanced between cut and fill sections.

Two International TD-18 tractors equipped with Bucyrus-Erie cable-controlled bulldozer blades were used as pusher tractors, and for odd grading jobs. Two more International TD-18's with Heil 6-yard scrapers were used for short hauls and finishing. A LeTourneau K-30 Rooter with a single tooth scarified rock cuts ahead of the scrapers and Tournapulls. It was towed by one of the International TD-18 tractors. Its bulldozer blade was disengaged when the International was busy with the Rooter.

One of the peculiarities of this grading project was the presence of a very light Lebanon silt-loam soil. Because it was generally found near the surface, its susceptibility to erosion was easy to see. One of the requirements of the specifications, therefore, was aimed at efficient disposal of the material deep in the body of fills, where it could not be subject to erosion. If crosshauls over the balance points were necessary to accomplish that objective, the contractor had to make them. However, it was found that the material was balanced even better than had been expected,

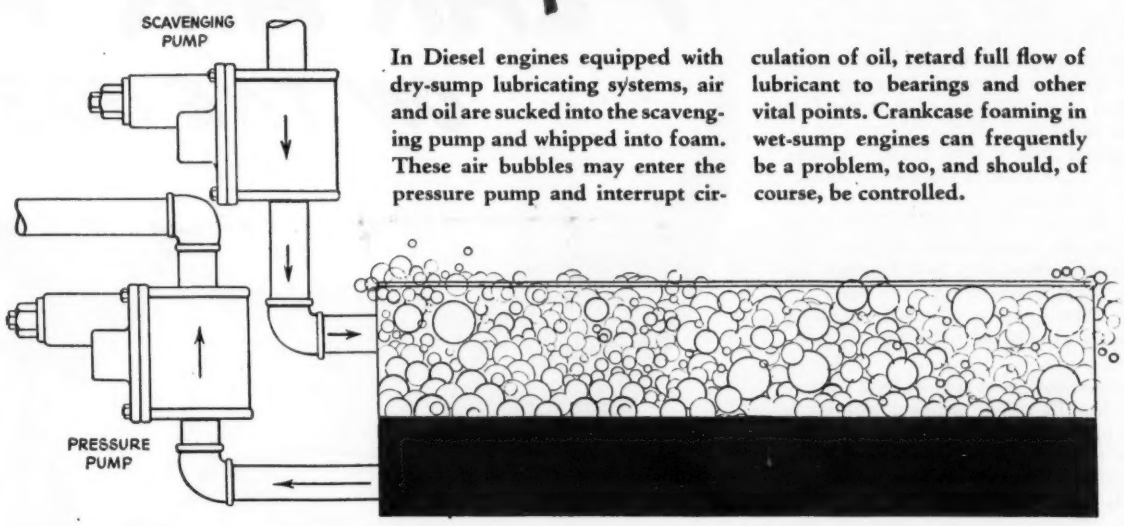
(*Continued on next page*)

C. & E. M. Photo

This International TD-18 in first gear tows a single-tooth LeTourneau K-30 Rooter through a tough rocky cut on the Porter-DeWitt Construction Co. job in Missouri.

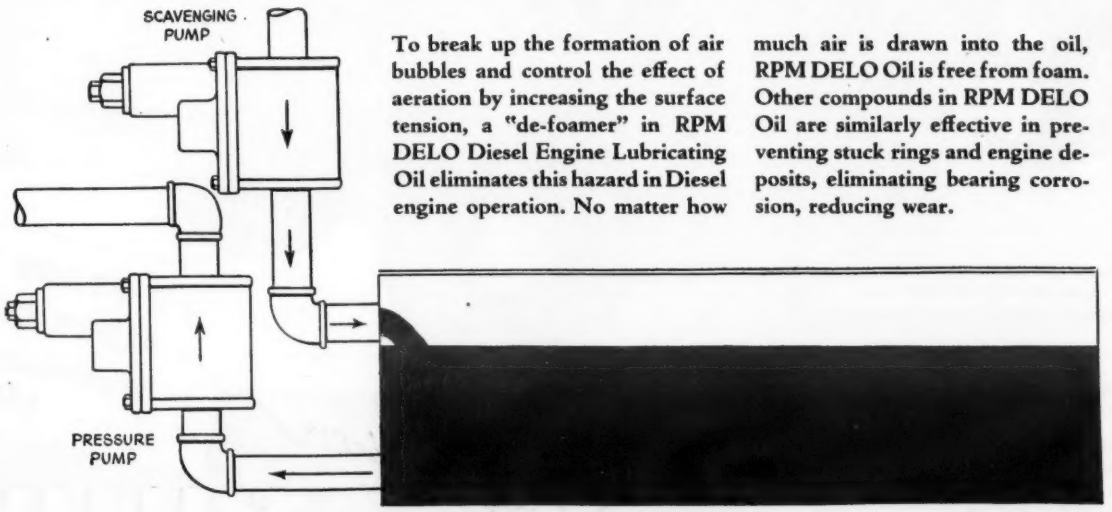
Diesel Engine DANGER points

AIR BUBBLES ENDANGER OIL CIRCULATION



In Diesel engines equipped with dry-sump lubricating systems, air and oil are sucked into the scavenging pump and whipped into foam. These air bubbles may enter the pressure pump and interrupt circulation of oil, retard full flow of lubricant to bearings and other vital points. Crankcase foaming in wet-sump engines can frequently be a problem, too, and should, of course, be controlled.

RPM DELO OIL PREVENTS CRANKCASE FOAMING



To break up the formation of air bubbles and control the effect of aeration by increasing the surface tension, a "de-foamer" in RPM DELO Diesel Engine Lubricating Oil eliminates this hazard in Diesel engine operation. No matter how much air is drawn into the oil, RPM DELO Oil is free from foam. Other compounds in RPM DELO Oil are similarly effective in preventing stuck rings and engine deposits, eliminating bearing corrosion, reducing wear.

To match the fine performance of RPM DELO OIL, use these equally efficient companion products from the same famous "RPM" line—RPM HEAVY DUTY MOTOR OIL —RPM COMPOUNDED MOTOR OIL—RPM GEAR OILS AND LUBRICANTS—RPM GREASES. For additional information or name of your distributor, write any of the companies below:

STANDARD OF CALIFORNIA • 225 Bush St., San Francisco 20, California
THE CALIFORNIA COMPANY • 17th and Stout Streets, Denver 1, Colorado
STANDARD OIL COMPANY OF TEXAS • El Paso, Texas
THE CALIFORNIA OIL COMPANY • 30 Rockefeller Plaza, New York 20

DIESEL ENGINE RPM DELO LUBRICATING OIL

SAVE $ and INCREASE TRACTOR POWER

The Bulldozer Blade Nu-Edge Bar is butt-welded to new or worn blade and welding bead covered with a thin layer of hard-surfacing electrode—Affording 2000% savings in blade replacements.

Bulldozer Tractor Grip-Lugs

are easily welded to any size grouser shoe without dismantling assembly. Made of special work-hardening steel which becomes tougher with use —outwearing original grouser.

See Your Local Dealer
Send For Folder CE Today

SOLE PRODUCERS
ALLIED STEEL PRODUCTS, INC.
7835 BROADWAY • CLEVELAND 5, OHIO

Sealed Crushed Rock Replaces Rural Road

(*Continued from preceding page*)

and only about twenty loads were hauled across balance points.

Most of the grading had been finished when the job was visited for CONTRACTORS AND ENGINEERS MONTHLY, and the Tournapulls had turned in good yardage performance. One memorable day when the hauling distance was down to 650 feet, the machines were turning in a load every 4 minutes. A Caterpillar D4 tractor was busy pulling a sheepsfoot roller continuously as the fill progressed.

Select-Base Processing Sequence

Density tests were run continuously as the fill progressed to make certain the grade checked at least 90 per cent of standard optimum weight. A modified form of the Proctor method was used.

The top of the backslopes was rolled and dressed by a motor grader at the same time the subgrade was finished. Processed-earth subgrade was turned open to traffic and maintained by the No. 12 grader for a minimum of five days before the rock was brought in.

The next stage in the construction of this improved type of road was the laying and processing of the main base course of rock. Crushed rock from the contractor's plant was hauled by a fleet of five International 5-yard dump trucks, and spread on the road. One truck spotter controlled dumping.

It had been determined that the first 3-inch layer of rock would have to be laid about 3¾ inches thick, uncompacted. This volume had been calculated at 50 tons per 100-foot station, and loads were figured on this basis to arrive at the correct field spacing. The rock was dumped only half the roadway width, leaving the other lane open for traffic. The routing of traffic through the job was one of the contract provisions.

Dumped rock was spread by a Caterpillar No. 12 motor grader, wet by a group of three water trucks with 1,000-gallon tanks, and processed by pneumatic-tire rollers and finally by smooth-wheel Buffalo-Springfield steel rollers. The water was loaded in the trucks in Belle, Bland, or Owensville, whichever town was closer to the place the rock was being spread.

C. & E. M. Photo

J. S. Trotter (left), Superintendent for Porter-DeWitt Construction Co., Division Construction Engineer G. L. Gray, and Paving Foreman Everett Oliver (right) discuss blueprints for a culvert on the Missouri State Route 28 job.

The second layer 3 inches thick was dumped and rolled in the same manner, except for the fact that only 45 tons per station were placed. When this layer was finished the road had a very smooth and dense texture, owing to the great amount of fines in the crushed material. Rain falling on the road at that stage left small puddles of free water, which would not soak in for 15 minutes. That is a guide to its permeability.

The next step was the application of a prime coat of MC-O asphalt as a substitute for tar, which could not be secured. It was applied by a pressure distributor at the rate of 0.25 gallon per square yard. It went down at an average temperature of 130 degrees and penetrated approximately ¼ inch. The prime coat was always applied when the surface was dry.

After the prime coat had set for a minimum of 24 hours, 0.5 gallon per square yard of 200 to 250-penetration asphalt was applied by the same distributor at a temperature of 300 to 350 degrees F. This asphalt was followed immediately with the application of 40

(*Concluded on next page*)

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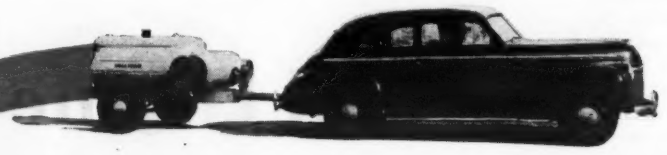

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C. & E. M. Photo
This batching bin, shown as it takes the discharge from the rock plant, was used to load dump trucks which hauled the select crushed rock for base course to a Missouri road job.

Sealed Crushed Rock Replaces Rural Road

(Continued from preceding page)

pounds of chips per square yard, and the road opened to traffic.

Rubber tires on local traffic will bond the chips in the surface asphalt, and the result will be a road that is smooth, durable, and modern. Should it be decided to improve the road still further, it will be very simple to run some hot-mix asphaltic-concrete paving on this dense rock subgrade. Excess rock chips, if any, will be taken care of by state highway maintenance forces, who will take over sections of the road when it is finished.

Rock Crushing

Specifications on the crushed rock were very rigid, especially with reference to fine sizes. The designed screen analysis of base-course material was as follows:

Size Mesh (Square)	Per Cent Passing
1-inch	100
No. 4	40-60
No. 40	15-35

(5 per cent tolerance on 1-inch up to 1½-inch sieve)

It has been reliably reported that Superintendent J. S. Trotter of the contractor's organization can smell good rock. Be that as it may, Trotter located a deposit of good limestone hidden under some debris and overburden. Stripping of about 4 feet was done by a bulldozer on a Caterpillar D8 tractor.

A Schramm 315-cfm compressor and one Cleveland wagon drill were brought in. Holes were drilled on 10-foot centers, using various lengths of steel up to 18 feet. Detachable bits were used and discarded after they were worn. The blasting ratio was 1¼ pounds of 40 per cent gelatin per cubic yard, which fractured the stone very satisfactorily.

Porter-DeWitt set up a custom-made rock-crushing plant for processing this blasted stone. The set-up was made on concrete pedestals, in semi-permanent fashion. The plant consisted of a Cedarapids 25 x 40 jaw crusher, a Pioneer triple-roll crusher, a Telsmith double-roll crusher, and a set of triple-deck Pioneer vibrating screens. The rock plant was powered by two International UD-18 diesel power units, with a Caterpillar D11000 and a Louis-Allis generator furnishing all electric power for the motors on the 24-inch conveyor belts.

Considerable difficulty was experienced early in the job in getting the right amount of fines in the mix. The roll crushers were tightened, but it was necessary to take out the rolls and grind them down to true cylindrical shape before the proper adjustments could be made.

The design secret of the new rock base lies in the angular characteristic of the crushed-rock particles. They interlock when compacted, and develop great strength. The use of crushed rock here replaced the rounded alluvial creek gravel, which has been used on Missouri gravel roads for decades.

Personnel

The job was done under the general supervision of Chief Construction Engineer J. J. Corbett of the Missouri State Highway Department. V. B. Saville is the Division Engineer, with G. L. Gray as Division Construction Engineer. Orville Ratliff was Project Engineer. J. S. Trotter was Superintendent for the contractor and Elmer Shelton was Rock Plant Foreman. Fred Pulliam was in charge of processing the rock.

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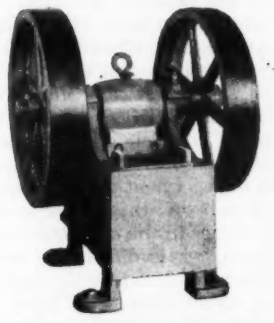

1906

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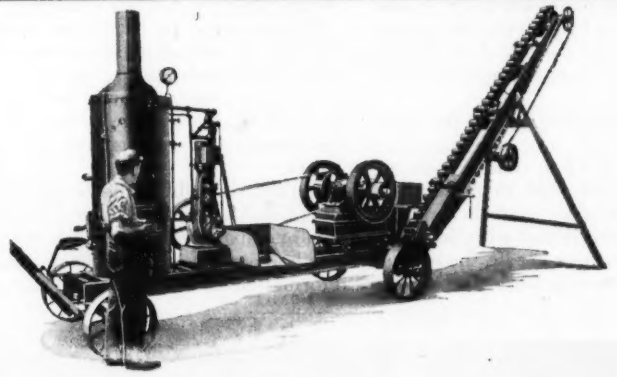

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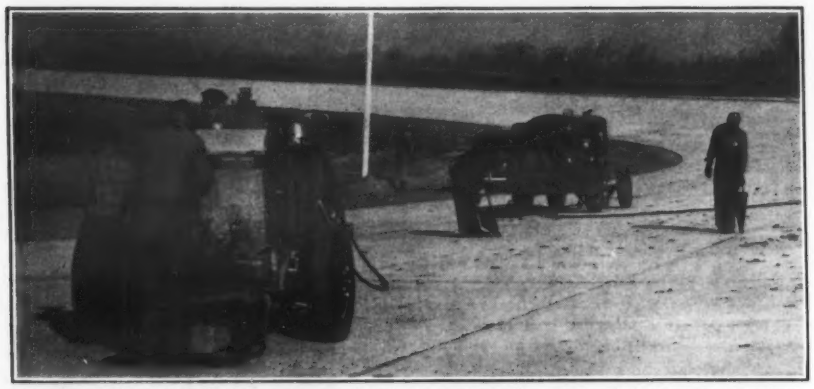


On the Julius Porath & Son Co. contract for paving the Packard Motor Co. Proving Ground in Detroit, one of the new Aeroil 120-DVP kettles was used to heat the Paraplastic rubberized-asphaltic joint compound. A total of 84,000 linear feet of joints was poured, at an average rate of 550 feet per hour.

Indirect Heating Is New Kettle's Feature

The use of new rubber-asphalt joint-sealing compounds, with characteristics different from the bituminous types in use, has resulted in the development of new equipment designed specifically for them. One of these is the Heat-Master double-vat kettle, Model 120-DVP, made by Aeroil Products Co., Park Ave. at 57th St., West New York, N. J.

The Model 120-DVP uses a double-boiler heating principle. It is designed to provide uniform thermostatically controlled indirect heat that is essential for application of these compounds. Since the rubber in the compounds acts as an insulator, it is difficult to maintain a constant temperature throughout. Moreover, direct heat will burn the compound next to the kettle and render it useless. The model 120-DVP is said to bring uniform heat to the compound from the sides and bottom of the kettle, as well as from within the melting compound itself.

To keep this uniform heat at the temperature required by the particular compound being used, a new type of valve has been adapted to permit the use of thermostatic controls on the kettle. It is claimed that with this control, once the burners are lit, the operator need only turn a knob dial to the temperature required. Then the burners go on and off automatically as heat is needed to keep the melted material at the necessary temperature.

The kettle comes mounted on a two-wheel trailer with a stand which holds two bottles of gas used as fuel.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 15.

Apron Feeders Described

Apron feeders for quarry, aggregate-production, and similar installations is the subject of a new bulletin just released by Pioneer Engineering Works, 1515 Central Ave., Minneapolis 13, Minn. Designed to present factual information, the new bulletin contains complete specifications on 69 various models, types, and sizes of standard Pioneer feeders that are available.

Feeders can be furnished without sideboards, with straight sideboards, or with flared sideboards; for drive by gear motor, by conveyor tailshaft, or by crusher. Lengths from 6 to 14 feet are standard in widths from 30 to 48 inches.

Besides describing the feeder in detail, Catalog No. 563 gives complete data on capacities, dimensions, weights, and horsepower. Of special interest is information on how to order the right feeder for the job.

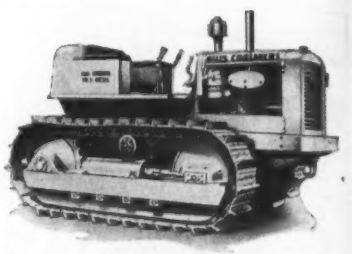
Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 79.

New Crawler Tractor

The addition to its line of a 37-hp crawler-type tractor has been announced by Allis-Chalmers Mfg. Co., Tractor Division, Box 512, Milwaukee 1, Wis. The unit is powered by a General Motors 2-cycle diesel engine, which features unit injection, 4-way cooling, and parts that are interchangeable with the engines which power other Allis-Chalmers Series 71 tractors.

There are 5 speeds forward and a reverse speed of 2 mph. Grease-packed truck wheels, idlers, and support rollers, which are serviced at the factory, are said to require greasing thereafter only once every 1,000 hours. Auxiliary pieces of construction equipment are available, some specifically engineered for use with this HD-5 tractor.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 16.



The new Allis-Chalmers HD-5 is a diesel-powered tractor with a choice of 44 or 60-inch tread.

Whiteman Enlarges Plant

In order to meet the growing demand for concrete equipment, Whiteman Mfg. Co. has found it necessary to double the amount of floor space in its plant. The factory is located at 3249 Casitas Ave., Los Angeles, Calif. Chief products of the firm are rodding and floating-finishing machines.

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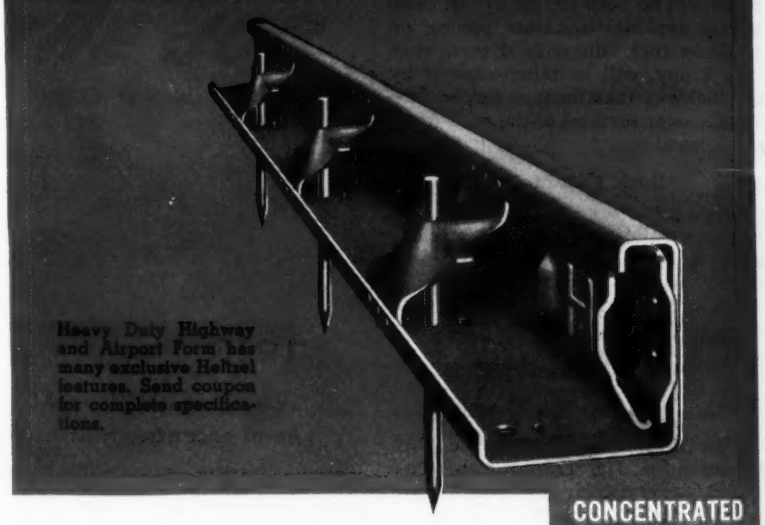

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Methods for Saving Right-of-Way Trees

Air-Moisture Relationship in Soil Must Be Kept at Normal Level if Trees in Right-of-Way Are to Be Protected During Grade Changes

✦ THE importance of trees in roadside development has long been recognized. But too often little or no thought is given them until after the construction job is completed. This has resulted in the loss of many large and beautiful trees that might have been saved with a minimum of thought and care given to the problem.

With this idea in mind, Dr. Paul E. Tilford, Executive Secretary, National Arborist Association, Wooster, Ohio, suggests several important steps to follow in preserving trees during grading and construction operations.

Two essential requirements for the growth and activity of tree roots are air and water. Whenever anything happens to change the air-moisture relationship in the soil from the normal, certain physiological changes are inevitable; they are usually detrimental to the tree. Compacting the soil under trees, filling in soil over the roots, and lowering grade level near trees alters this relationship and injures the trees.

Selecting Trees to Save

It is obvious that it would be impossible to save all trees along a highway right-of-way during construction. Therefore, some factors to consider in selecting the important trees to protect are as follows:

1. Size, condition, and species of the tree. Very old and debilitated or very young specimens are seldom worthy of expensive protection. Normally long-lived species should usually be given first consideration. Beeches, oaks, maples, lindens, and most conifers generally will not stand much fill on their roots unless they are adequately protected.

2. Probability of serious disease or insect attack which may kill the tree within the next few years. At the present time it would not be advisable, for example, to spend much money protecting an American elm in the phloem necrosis area, unless the tree has shown evidence of being resistant to the disease.

3. Presence of other trees. A tree growing alone should be more worthy of protection than one at the edge of a wood or grove.

4. Trees with a historical background which would make them desirable to save.

5. Degree of grade change involved. The amount of cut or fill which affects the tree under consideration will have a major bearing on the extent of grade protection necessary to preserve it. If the change of the grade is excessive, the expense of protection may be greater than the value of the tree.

In any grade-change protection scheme, the object is to prevent a sudden and severe change in the air-moisture condition in the soil around the tree that is to be protected. When fills are made, it is necessary to supply a means for air to get to the buried root system. In the case of cuts, it is necessary to preserve as much as possible of the original soil level over the root area so that the soil moisture will not be greatly reduced and not many of the roots will be damaged.

Protection of Trees During Fills

The first operation in protecting trees against the harmful effects of fills over their roots is to remove all living vegetable matter from the root area. This is necessary because when fresh organic matter is buried deeply and decomposes under anaerobic conditions, toxic products are formed. The soil should be loosened and cultivated but the tree

(*Concluded on next page*)

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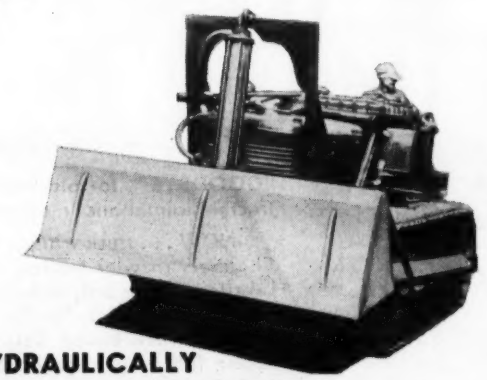

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The Jacques Hydraulically Controlled Bulldozer is precision engineered to insure rugged strength and ease of operation. Blade, which comes in different widths to fit different jobs, has scientifically designed contour to move dirt or other objects quickly and uniformly, has high lift for throwing and effective down pressure for digging.

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1. ALL PLUMBING is hydraulically controlled, enabling faster operation and transportation from hole to hole as machine can be instantly lowered to traveling position, and again quickly placed in operating position regardless of the unevenness of the terrain.
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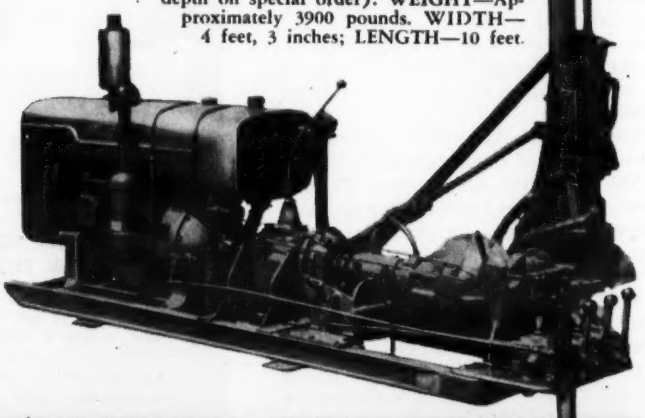

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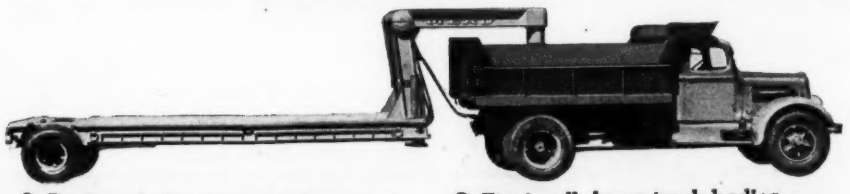

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Methods for Saving Right-of-Way Trees

(*Continued from preceding page*)

roots should not be injured. It is usually advisable to fertilize the tree.

The following method has been found successful for protecting trees where fills are necessary. In this method, 4-inch porous agricultural tile is laid in a U-shape under the drip line of the tree, with the ends of the U extending downhill and outwards to the face of the proposed slope. The gradient of the tile lines should be such that drainage will be away from the tree. All tile joints should be covered with tarred paper to keep out debris.

A dry well is constructed around the trunk of the tree with the coping flush with the final ground surface. The inside diameter of the well should be determined by the growth probabilities of the tree. The radiating tile lines should start at the very bottom of the inner wall of the well. Large stones, brick, building tile, or concrete blocks may be used for constructing the well. It is best to leave voids in the wall if stones or bricks are used, and to turn tile or concrete blocks endwise so that the holes will extend through the wall to facilitate the exchange of air from the outside to the filled soil.

Enough rocks and gravel should be placed in the well to cover the ends of the tiles. If the fill is extensive, provision should be made to connect the radiating and circular tile lines to the new ground surface. This can be done by erecting vertical sections of bell tiles at the intersection of the tile lines.

Large stones are then laid over the entire area, the depth to be determined by the depth of the fill. A 1-foot layer of stone should be sufficient for a 2 to 3-foot fill. The stone should be laid, and not dumped, to prevent damage to the tile lines. A thinner layer of crushed rock or smaller stones should be placed over the large stones to fill the surface voids. This should be followed by a thin layer of straw to prevent the soil from sifting down and closing the voids in the stone layer. Good topsoil should be used to bring the fill to the desired grade.

Another less elaborate method to use consists first of determining the extent of the root area of the tree. Then it seeks to provide aeration for an adequate ball of roots for the tree, rather than for the entire area.

In this method, six or eight wooden stakes are driven into the soil in a circle about 2½ feet from the base of the tree. Heavy tar paper is tacked to these stakes, starting about a foot above the original grade. The height of the stakes and paper is determined by the depths of the fill to be made. The entire area to be aerated is covered with stones to a depth of a foot. Large stones should not be used around the base of the tree. The stone fill, when completed, will come up as far as the bottom of the tar paper.

The next step is to cover the rock area outside of the tar-paper retainer with building paper. After this is completed, the remaining materials needed are the dirt fill and crushed rock or egg gravel to be placed inside of the retainer. It is best to fill the inside of the retainer with gravel and apply the soil fill outside at the same time to prevent tearing of the paper retainer. With this method as with any other method of aeration, it is important to insure adequate drainage; otherwise the work will be in vain.

Protection of Trees During Cuts

In lowering grades, opposite problems are presented. In this case, aeration is usually adequate, if not excessive, but the moisture supply is reduced. Here the objective is to prevent excessive drying of the soil, increase the soil's moisture-holding capacity, and to stimulate root development, particularly the deeper roots and those in the root area least affected by the change.

The soil-water level in most soils tends roughly to parallel the surface of the soil. Therefore, it is important that as much of the normal soil level be retained around the trees as is possible. The erection of masonry retaining walls often accomplishes the desired result. A mixture of peat moss and topsoil should be used for the backfill material inside the wall.

A modification of this plan is to mold the soil surface around the tree into the new general slope rather than arbitrarily to cut the slope and roots to conform to a uniform grade.

Mulches of leaf mold, peat, straw, etc., should be placed over the root area. Deep fertilization and watering are advisable where feasible. A permanent ground cover should be established as quickly as possible.

Care in Working Around Trees

In conclusion, a great deal of care should also be exercised when using heavy machinery around trees. If patches of bark are knocked off, the edges should be traced, the wound painted, and the area covered with an asphaltum tree-wound dressing as promptly as possible.

From a paper presented at the Fifth Annual Short Course on Roadside Development, Columbus, Ohio.

Chevrolet Appoints Mallon

The appointment of T. C. Mallon as Assistant Manager of the commercial and truck department of the Chevrolet Motor Division, General Motors Corp., has recently been announced. He first became associated with Chevrolet in 1934. Since then he has served at Detroit, Denver, Indianapolis, New Orleans, and Omaha.

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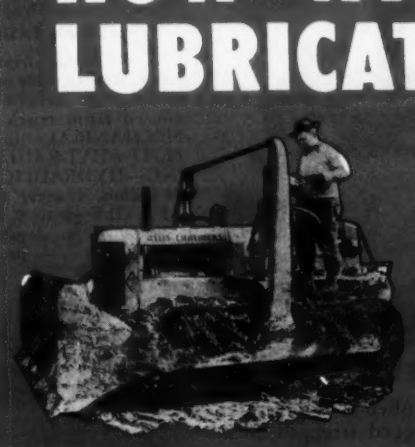

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For the full story of this and other features which make Allis-Chalmers tractors steady, high yardage movers, contact your Allis-Chalmers dealer.

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Dual Overpass Spans River and Railroad

Reinforced-Concrete and Structural-Steel Spans With Heavy Earth-Moving In $450,000 Contract

(*Photos on pages* 1, 44, *and* 45)

A TRAFFIC-flow problem from the days of war is being solved in the days of peace by a $450,000 overpass structure now being built across the Union Pacific railroad and the Weber River near Ogden, Utah. The Utah State Road Commission contract by Gibbons & Reed Co. of Salt Lake City is expected to ease the dangerous traffic situation on Highway 91 at Ogden's southwestern outskirts. And the traffic-carrying capacity of U. S. 91 will be doubled by the reduction of this bad bottleneck.

Construction of the dual overpass has been a battle for materials. Structural steel for the 4-lane railroad span was promised for late 1946, but the delivery date has been moved along to the spring of 1947. Deliveries of reinforcing steel have been more or less uncertain. When the job was visited for CONTRACTORS AND ENGINEERS MONTHLY, it was ahead of schedule. However, the lack of structural steel had begun to show its retarding effects on progress. Claim for time extension may have to be made if deliveries cannot be secured well in advance of the 300-working-day time limit from July 5, 1946.

The principal features of the overpass project include the Weber River Bridge, a 4-span 222-foot reinforced-concrete T-beam structure with three river piers and two abutments; the Union Pacific railroad overpass, a 6-span 385-foot structural-steel and reinforced-concrete structure with five piers and two abutments; and 170,000 cubic yards of rolled-earth-fill plugs and approaches. A total of 4,156 cubic yards of concrete, 147,200 pounds of structural steel, and 978,200 pounds of reinforcing steel are involved. The project was described by Chief Engineer Roy W. McLeese of the Utah State Road Commission as "one of the most important jobs on our 1946 agenda".

The bridges, with a roadway width of 54 feet and an overall width of 64 feet, are designed to carry four lanes of traffic with a 4-foot neutral zone in the middle. The Weber River structure will contain 1,564 cubic yards of Class A reinforced concrete. The overhead across the Union Pacific railroad tracks will have 2,526 cubic yards, in addition to the structural-steel span directly over the railroad.

The Weber River Bridge piers will rest on 30-foot untreated-wood piles driven to a bearing of 60 tons. The abutments will be supported by 40-foot treated-timber piles driven to the same bearing. Railroad-bridge piers will be set on a well consolidated gravel formation, with the abutments supported by Union Metal steel Monotubes 33 feet long in the fills on either side of the structure.

C. & E. M. Photo

Heavy equipment gets a grease job on the Gibbons & Reed project. The dual overpass being built by this firm will replace the structure seen in the background.

Diversion of Weber River

The Weber River is a fast-flowing stream which normally carries approximately 700 cfs. It had to be diverted while the bridge piers were excavated, the pile driving accomplished, and the concrete placed. Seven pieces of Armco 36-inch corrugated-metal pipe were laid in the stream ahead of the job, and a dirt and gravel road was bulldozed over the pipes. This service road was built to carry the dirt-moving equipment across the Weber River to the fills on the south end of the project, and to facilitate construction of the Weber River Bridge.

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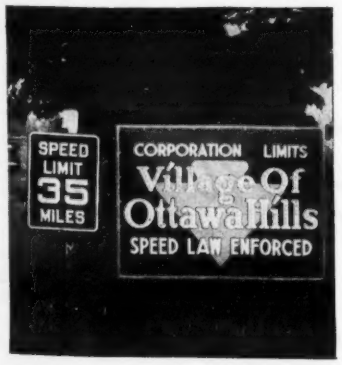

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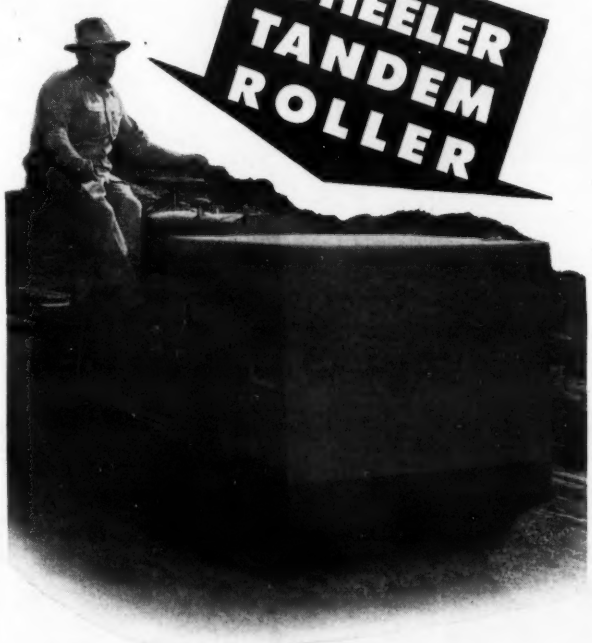

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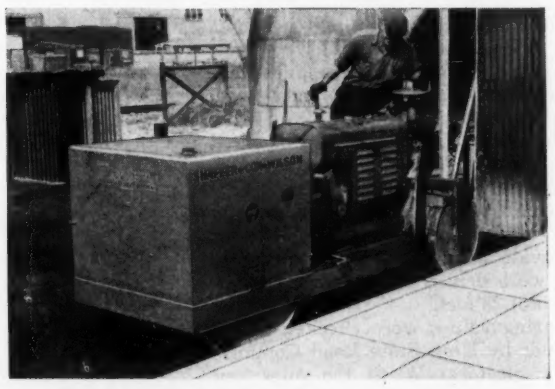
SPECIFICATIONS

DIMENSIONS—Length, 10'7"; Width, 3'6"; Height, 3'11".
COMPACTION ROLLER—Width, 36"; Diameter, 37".
STEERING ROLLER—Width, 34"; Diameter, 27".
POWER—4 cylinder, 1400 R.P.M., industrial gasoline engine, with 2 forward and 2 reverse speeds.
COMPRESSION PER LINEAL INCH—Compaction roller—150 lbs. with ballast, 105 lbs. w/o ballast. Steering roller—70 lbs. with ballast, 48 lbs. w/o ballast.

CLOSE FINISHING is possible because frame extends only 1½ inches past left side of roller.



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Dual Overpass Spans River and Railroad

(*Continued from preceding page*)

An earth and rock cofferdam, composed of materials native to the streambed at that point, was then built by a Northwest 1-yard dragline. The cofferdam was built to shunt the Weber River through approximately half of its normal streambed. After it was built, two exposed pier areas were unwatered by a Jaeger 6-inch suction pump. The intake for this pump was set in a sump at the downstream end of the pier foundations. The pump was operated continuously while pile driving and the initial concrete work were in progress. The unwatering pump discharged on the riverward side of the protective-diversionary cofferdam.

When two piers had been built, a short section of levee was built behind the initial construction to connect the service road with a point 120 feet down on the main cofferdam. When the initial plug was removed, the river moved back to the other side of its original channel, and passed through the two completed piers. Unwatering was then done for the third river pier with the same equipment as had been used in building the first two piers.

Pier Pile Driving

Specifications for the job called for all piling to be driven with a stationary set of leads. A 40-foot set of movable leads was brought in and made stationary by welding rigid supports from the base of the leads to the base of the cab frame at the sides of a Koehring crane. The top of the leads was held close against the boom-point sheave to stiffen that point.

Wood piles were picked up by a line on the front drag drum, and set down on wood hubs located by a survey party. No jetting was allowed. The piles were driven through the sand and gravel riverbed materials by a Vulcan No. 2 single-acting hammer. It was powered by a 315-cfm Chicago Pneumatic air compressor, mounted on a GMC flat-bed truck, which was supplemented by a 105-cfm Jaeger portable compressor to provide ample total air capacity. The piles were driven to an average penetration of 28 feet.

Bearing values were checked at the hammer by Utah State Road Commission inspectors. When the piles had reached the point of acceptability for bearing, they were cut off square, 12 inches above the bottom of pier concrete.

The specifications called for abutment piles to be driven through the finished earth fills. But when this was attempted, it was discovered that the earth fill had been compacted so thoroughly that it was impossible to penetrate the embankment and get down to the material in the streambed without the aid of jetting. Then a layer of cemented gravel and small boulders was encountered just below the compacted fill which offered too much resistance even to jetting.

Superintendent W. E. Swanson of Gibbons & Reed therefore asked permission to dig out the embankment and the cemented gravel and boulders at the abutments, to drive the piles to their proper elevation, and to re-compact the embankment around the driven piles with tamping equipment. Permission was granted by the State Road Commission and the job was completed to the satisfaction of all concerned.

Structural Concrete

Pier and deck concrete for the dual overpass marks what may be a turning point in Utah's concrete design. The project specifications call for the use of air-entraining portland cement at the ratio of 6.3 sacks per cubic yard. The use of air-entraining cement was recommended by the Public Roads Administration when the original State Highway Commission plans came up for review.

The concrete batch is designed on a water-cement ratio of 36 gallons per 1.1-yard batch, using sand, cement, and two sizes of aggregate. Aggregates in the large size are graded from 1½ to ¾ inch. Smaller rock ranges from ¾ inch to No. 4, and sand ranged from No. 4 to No. 200. Concrete-aggregate design was based on a fineness modulus of 7.5.

Pier forms were largely prefabricated in a carpenter yard adjacent to the Weber River and hauled by truck to the pier sites. Surfaced shiplap lumber 1 x 6 inches and 1 x 8 inches, lined with ⅝-inch plywood, was used for forming. This material was stiffened by 2 x 4-inch studs spaced at 24-inch centers, and crossed at right angles by wales spaced 48 inches on centers. Wales were made from double 2 x 4-inch pieces,

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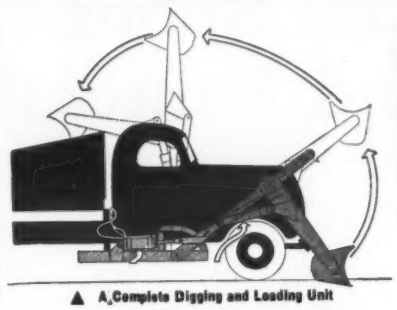

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C. & E. M. Photo
This 1,000-gallon water-tank truck loads up at a spout kept under pressure by a Jaeger 4-inch pump, on the Gibbons & Reed $450,000 contract for a dual overpass.

Dual Overpass Spans River and Railroad

(Continued from preceding page)

secured by removable wing nuts and metal rods through the piers.

Dry-batched rock and sand was hauled from a commercial deposit near Ogden. The fleet of eight batch trucks dumped to the skip of a Rex 34-E dual-drum paver. Portland cement in paper bags was added at the paver skip, and mixing water was pumped from the Weber River. After a 60-second mix, batches were dumped from the paver into a bottom-dump concrete bucket. This bucket, handled by one of two cranes on the project, was used to dump the concrete into the forms for the structures. Canvas elephant-trunks were used when pouring bridge and overpass columns and piers.

Experience on the overpass structure has pointed out that air-entrained concrete may lose some of its desirable characteristics when it is placed in narrow or small-dimension structures. The Weber River Bridge concrete was placed at a slump of 2½ inches in a 12-inch cone, in order to secure the workability that was necessary to get it down through the reinforcing-steel mats. When the concrete was vibrated sufficiently to insure proper placing and distribution, some of the entrained air bubbled up out of the mix. The men who placed the concrete on the Weber River Bridge piers believe that concrete will lose most of the entrained air in closely confined spaces, simply from the necessary use of vibrators to obtain a good concrete job.

The Rex paver was used on piers and concrete members, even though it was a little too large a machine for the yardage involved, because it may be used later in pouring bridge decks. It will also be used to pour the two outside concrete traffic lanes, where it will be able to work at full capacity. The woodpile falsework for bridge decking and traffic lanes was driven in the Weber River bed at the time pier piles were driven. Later this year these piles will support the deck forms.

All exposed bridge concrete is being stripped as soon as specifications permit. While the concrete surface is still comparatively fresh, the surface is being dressed with emery stones to erase the plywood form marks and provide an excellent-appearing finish.

Earth Work

Earth work consists of compacted embankments: one connecting the Weber River Bridge with the Union Pacific railroad overpass, a south approach fill, and a transition at the northern end of the railroad overpass towards Ogden. The excavation of this dirt has involved one of the most dramatic construction schemes ever seen in the west: the use of Model C and Super C LeTourneau Tournapulls on 40 to 50 per cent slopes.

Equipment salesmen and veteran dirt-movers were skeptical about the use of this type of equipment for this particular job. They said it couldn't be done without killing half of the operators. Ironically enough, the men who proved it could be successfully done are veteran dirt movers. They are J. P. "Pat" Gibbons, General Manager of Gibbons & Reed Co., and youngish Cal-Tech-educated W. E. Swanson, Job Superintendent and formerly a civilian wartime assistant to Col. Lester F. Rhodes of the U. S. Army Engineers.

This borrow problem was tricky because of the way the dirt was situated. The cheapest source of satisfactory earth, from the point of view of the State Road Commission, was located in an earth hill adjacent to the main-line U. P. railroad tracks. It was composed of about 20 per cent of clay in strata, and 80 per cent of fine-grained sand and sand and gravel—an ideal soil if it could be mixed.

The top of the hill was approximately 145 feet above the railroad-track level. In constructing an access road to it for Tournapulls, the contractor faced this condition: the location was specified by the owner of the property. This made it necessary to put a 150-foot-radius curve at the bottom of the hill on the ingress road.

The access road was built by two Caterpillar D8's with LeTourneau bulldozers. After they had pioneered the earth

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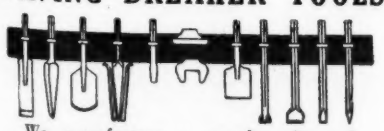

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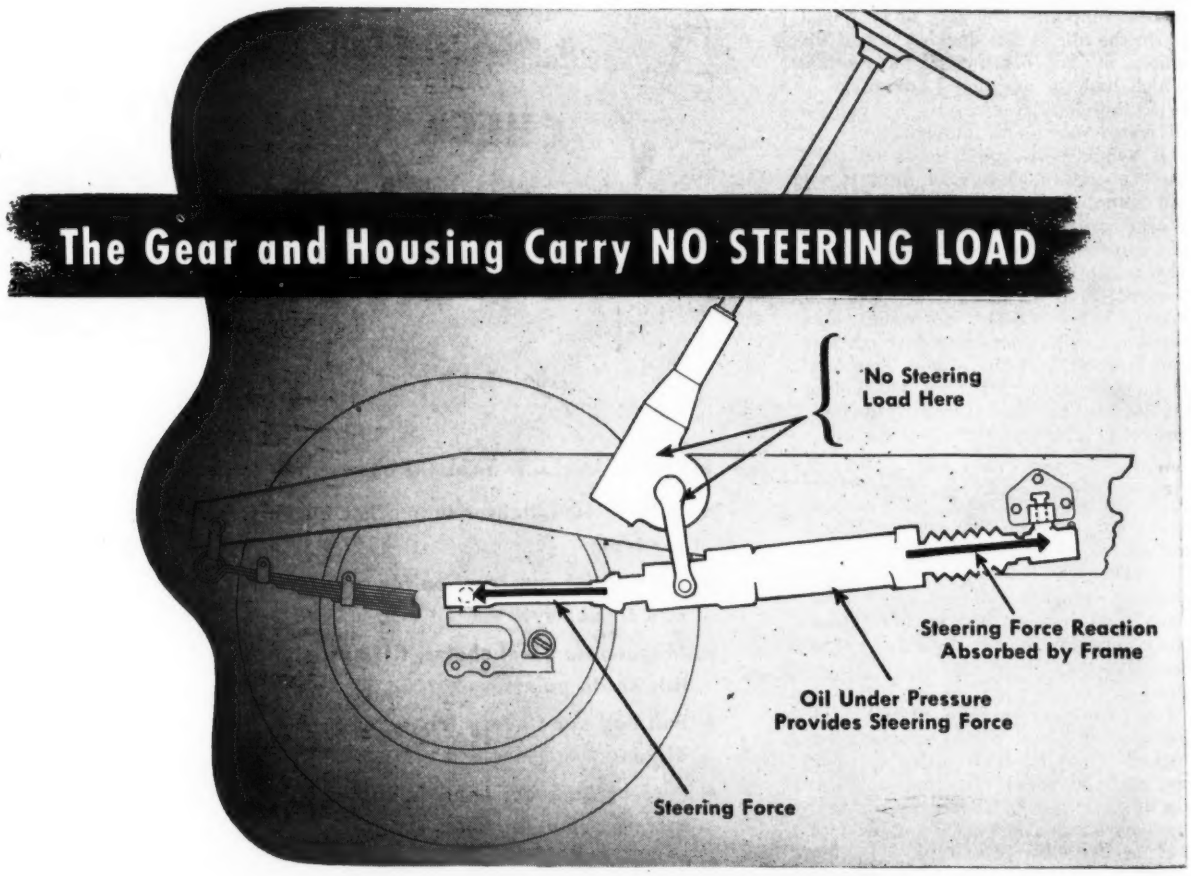
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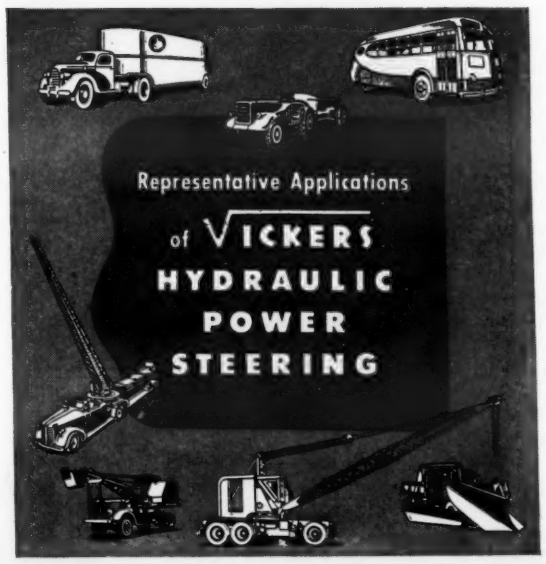

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Dual Overpass Spans River and Railroad

(*Continued from preceding page*)

work, a Caterpillar No. 12 motor grader dressed the road. Approximately 300 cubic yards of Weber River gravel was hauled in and spread to make this access road a first-class roadway for the powerful Tournapulls. Graveling this road, dressing it daily with a motor grader, and sprinkling it with water made it possible for equipment to climb the 17 to 18 per cent grade in second and third gears, instead of having to go down to first gear.

Another important consideration in the method of earth-moving was the height of the finished embankments at overpass deck level. The steep ramps necessary to carry equipment from the lower level to the top of the embankment more or less prohibited the use of heavy water-tank trucks. With a full load, these machines would have had to use compound low gear or be towed up to the fill. It was decided to add the water at the borrow pit, a method which had the additional advantage of providing better uniformity and control of water in the fill material.

A 3-inch steel-pipe line was laid from the Weber Canal irrigation ditch to the top of the hill, and a 4-inch United Iron Works centrifugal pump was set in place at the foot of the hill by the canal. This pump was driven by a Caterpillar Seventy-Five diesel engine. Approximately 50,000 to 60,000 gallons of water per 8-hour shift was sent through this line in one lift by the pump. Two men at the top of the hill with 300 feet of 1½-inch rubber hose sprinkled the borrow pit in advance of the Tournapulls.

Proper mixing of clay and sand was accomplished by loading the Tournapulls downhill through the various strata and seams of clay, sand, and sand and gravel. With the help of one Caterpillar D8 pusher tractor and a pusher block, the machines picked up capacity loads in an average distance of 100 feet. The compaction factor of clay and sand from this borrow pit was about 20 per cent.

Tournapull production was very good. Load, travel, and dump cycles were clocked on round-trip hauls day after day, and the Super C's made a round trip in six minutes. The average round trip was about 3,200 feet, a 1,400-foot haul and 1,800-foot return. On the average round trip, the six Tournapulls had a productive capacity over the day of about 350 cubic yards per hour.

Operating Safely

The original 40 to 50 per cent borrow-pit slope was outlined first by a bulldozer, and several trips were made by a Carryall before the Tournapulls were turned loose. The first Tournapull picked up its load at the top of the hill. When it broke "over the hump" fully loaded, the operator dragged the loaded scraper to the ground so the cutting edge and the bottom of the Carryall could establish enough contact to hold back the heavy load on the descent. The descent continued to be made with caution until the slope had been reduced to 30 or 35 per cent and the operators were all used to the steep downhill grade.

Swanson said later, "Studies of the time difference between careful and haphazard descents on this slope showed very little, if any, loss of production. I am certain in my own mind that doing it the safe way prevented possible loss of life, injury, and damage to equipment."

Another serious hazard was the crossing of the main-line tracks of the Union Pacific Railroad. Originally the project had been set up so hauling equipment would use a narrow county road along the tracks through an underpass, cross over the existing narrow railroad overpass and Weber River Bridge, and get to the fill after nearly a mile of travel. But permission was secured from the Union Pacific Railroad for earth-moving equipment to make a direct crossing about 300 feet from the foot of the borrow-pit hill. The contractor agreed to station a laborer at the crossing to keep the main-line tracks clear of loose material dropped from the Tournapulls. He also agreed to pay the salaries of a railroad conductor and brakeman flagging at the crossing. Informed of all train schedules, the conductor and brakeman were vested with full authority to flag Tournapulls, the motor grader, water-tank truck, service trucks, or other contract equipment.

Ogden is a railroad center and train traffic is very heavy. When trains approach, earth-moving equipment was flagged and sent to the fills at the Ogden end of the project. This route did not necessitate use of the railroad crossing.

(*Concluded on next page*)

Fast, Low-Cost Equipment Cleaning With Oakite Steam Guns

Planned use of dirt-blasting Oakite Steam Guns, similar to the models shown, cut contractors' cleaning costs. Use them for steam-detergent cleaning of cranes, crushers, diggers, excavators. Watch these guns save manhours . . . reach tough-to-get-at spots . . . earn back initial cost in short time. FREE 24-page booklet gives all the details. Write TODAY!

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Dual Overpass Spans River and Railroad

(Continued from preceding page)

Processing Earth

Density requirements on the Ogden job were rigid. At least 90 per cent of optimum density, measured by AASHO methods, was insisted upon because the earth work was all an integral part of the overpass structure. The moisture content and tamping were therefore very carefully controlled for uniformity by a dump foreman at the embankment. He sent word to the borrow pit to add more water or ease up on its application. By visual inspection he also controlled the mixing of clay and sand by the Tournapulls, in cooperation with the State Inspector. Considerable credit should be given Gibbons & Reed for going to such lengths, almost outside the requirements of the specifications, to secure good work.

The dirt was dumped in layers less than 6 inches thick, dressed by a bulldozer or a motor grader, and thoroughly compacted. This was done by six to eight LaPlant-Choate sheepsfoot rollers pulled by a Caterpillar D8 tractor. When there were eight, the rollers were spaced three abreast, with two rollers on the rear of the string. Rolling was carried on continuously as the embankments were placed.

Care of Equipment

Heavy equipment was serviced on the job by a portable fuel-alemite unit. Diesel fuel and greases were furnished by the Utah Oil Refining Co.; RPM Delo motor oil was used for diesel engines. Diesel engine lubricating oil was changed every 96 hours, and adjustments or small repairs made at night or on Sunday. Major overhauls and repairs were made by the mechanics at the Salt Lake City shops of Gibbons & Reed at Parley's Canyon. The parts situation was as acute in Utah as it was all over the nation in 1946, and at times caused delays on repair jobs to heavy equipment.

Personnel

On-the-job officials, in addition to Superintendent Swanson, included Assistant Superintendent Dougal Young; Excavation Foremen Dean Straw and W. A. Moody; Master Mechanic John Nazaryk; Carpenter Foreman Seth Atkinson; and Pile Driver Foreman G. I. Swart.

The Utah State Road Commission was represented by Resident Engineer Fred Miles. Roy W. McLeese is Chief Engineer of Utah, and Ray H. Leavitt is Chairman of the Road Commission. Carl Fonnesbeck is the District Engineer at Ogden. •

New I-H Power Units; Testing Field Leased

Start of production on two new-model power units has been announced by International Harvester's Industrial Power Division, 180 No. Michigan Ave., Chicago 1, Ill. Both are heavy-duty 4-cycle diesels with the same bore and stroke. The UD-18A will develop 125 maximum hp, and the UD-14A will develop 76 hp. The larger unit has six 4¾ x 6½-inch cylinders, and the smaller has four.

The company says that these models develop more power without increase in weight over the UD-18 and UD-14 models which they replace. A new cylinder-head arrangement, improved nozzles, and redesigned precombustion chambers give them higher compression and greater efficiency in converting fuel energy into power.

The International diesel starting system does not require preheating of the incoming air. Therefore it has been practical to locate the exhaust manifold on the injection side of the engine, away from the intake manifold. As a result, incoming air is kept cooler, it is said, and volumetric efficiency or breathing ability is greatly increased.

International's integral gasoline starting system has been retained in the new models. The engines are started on gasoline in the same manner as an ordinary gasoline engine. After a brief direct-flame cylinder warm-up, movement of a single lever changes the engine from the gasoline-starting cycle to 4-cycle diesel operation.

In addition to the new models, International announced the leasing of 1,920 acres of land near Phoenix, Ariz., as a site for experimental testing activities. The land, formerly used by General Motors as a tank-testing site during the war, has been leased for a period of five years from the Arizona State Land Department.

The area will be used as a testing ground for International Harvester's line of industrial power equipment which includes heavy crawler tractors, power units, etc. In addition, several makes of allied industrial equipment such as bulldozers, scrapers, and heavy earth-moving machines used in conjunction with the International line, will also be tested.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 37.

Wakem to Vice Presidency

The appointment of Francis J. Wakem to Vice President has been announced by the Johns-Manville Sales Corp. of New York City. Mr. Wakem began his association with the company in 1921. In addition to his new duties, he will retain his previous position as Merchandise Manager of the Industrial Products Division.

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2. *TOUGH* CENTER RUNNING RIB: minimizes wear and vehicle vibration on improved roads. Off-the-road, it restricts side slippage without loss of traction.
3. *TOUGH* CUT RESISTING TREAD: the rubber is compounded to resist cutting, snagging and bruising.
4. *TOUGH* ROUNDED SHOULDERS minimize snagging and cutting and improve flotation in soft going.
5. *TOUGH* EXCLUSIVE "U. S. SAFETY-BONDED CORD" construction produces the strongest, longest-lasting tire body possible.
6. *TOUGH* SHOCK PAD CONSTRUCTION: provides extra protection against ruptures and blowouts.

U.S. ROYAL CON-TRAK-TOR TIRES

SPECIFY *TOUGH* U. S. ROYAL CON-TRAK-TORS FOR LOWER COST PER MILE

UNITED STATES RUBBER COMPANY

1230 AVENUE OF THE AMERICAS • ROCKEFELLER CENTER • NEW YORK 20, N. Y.

Contracts Advance Thruway in New York

Five Projects Under Way With 15 Miles of Grading And Bridges on 486-Mile New Toll-Free Highway

(*Photo on page* 1)

✦ NEW YORK State got off to a good start in 1946 on its new 486-mile Thruway, which will cut across the state to link the Great Lakes with the Atlantic Ocean on one of the world's greatest highways. This long express highway is scheduled for completion in 1951. It will be without stoplights, intersections, grade crossings, or tolls, and is designed for fast, safe, and easy flow of traffic.

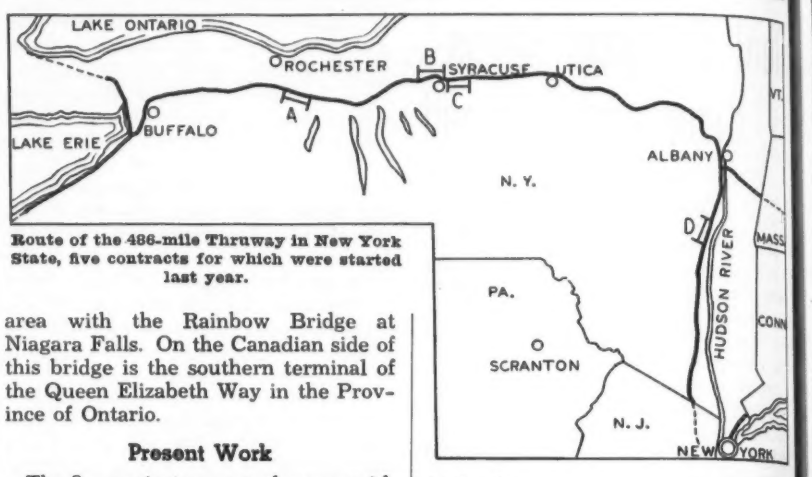
Beginning at the western border of the Empire State not far from Erie, Pa., the Thruway will skirt the big upstate cities of Buffalo, Rochester, Syracuse, Utica, Schenectady, and Albany, and then go southward on the west bank of the Hudson River to the New Jersey line. There it will be connected with the George Washington Bridge entrance to New York City by high-capacity New Jersey routes.

The construction of this toll-free Thruway will be financed largely from New York State's Post-War Reconstruction Fund, which was accumulated from surplus state revenues during the war years. Its estimated total cost of $202,000,000 is less than a quarter of the $840,000,000 which the State will spend within the next five years for the improvement and expansion of its 14,500-mile state highway system.

Five contracts for 15 miles of grading on different portions of the Thruway were awarded up to October 15, 1946. They included several grade-separation structures. This initial construction totals around $4,500,000, and is but the forerunner of many additional contracts which will be awarded in 1947 and succeeding years until the entire project is completed.

The Thruway system is divided into four main sections—Catskill, Mohawk, Ontario, and Erie—and three connecting sections—New England, Berkshire, and Niagara. The Catskill section extends from the New Jersey state line near Suffern to a point near McKownsville, west of Albany. From there the Mohawk portion continues to an intersection with U. S. 11 north of Syracuse, where it becomes known as the Ontario Thruway. This section reaches to the Buffalo area where the Erie Thruway begins. This extends to the Pennsylvania state line.

As for the connections, the New England spur will begin north of New York City near the intersection of the Bronx and Pelham Parkways, and will cross Westchester County to the Connecticut state line. The Berkshire connection will take off the Thruway south of Albany, and cross Rensselaer and Columbia Counties to the Massachusetts line. The Niagara section will connect the Erie Thruway in the Niagara Frontier area with the Rainbow Bridge at Niagara Falls. On the Canadian side of this bridge is the southern terminal of the Queen Elizabeth Way in the Province of Ontario.



Route of the 486-mile Thruway in New York State, five contracts for which were started last year.

Present Work

The five projects now under way with their location, length, cost, etc., are listed in the table on the next page. Work on the Thruway began last July, and these five projects are scheduled for completion in 1947; they will be followed by paving and landscaping contracts.

Construction Details

The new Thruway will admit trucks, buses, and other commercial vehicles besides passenger cars. It will have a

(*Continued on next page*)

TOUGH ON A LEDGE... EASY ON YOUR LEDGER

You can make short work of the toughest rock with this Blue Brute combination. Start with the New Worthington Wagon Drill, that swings its WD-40 Drifter into action at any angle . . . a fast, powerful drilling machine with a lot of improvements that make it the most versatile performer in its field.

Follow up with Worthington Hand-Held Drills. For example, the WJ-55 . . . medium weight, yet ideal for heavy work and a clean driller at depths up to 20 feet. Your runners will like its ease of operation . . . *you* will appreciate its ability to cut away more footage in less time.

And for always dependable power — a Worthington Portable Compressor. The 315′ is typical. Engine and compressor are joined in a single housing, with three-point suspension, and both are lubricated with full force feed . . . while the easy-breathing Feather* Valves get *all* the air power out of every drop of fuel — gently, positively.

Tough on a ledge, these three . . . but more than kind to your ledger. Because like all Worthington Blue Brutes they're built for continuous, trouble-free service at lowest operating cost . . . one of the outstanding reasons why *there's more worth in Worthington.*

*Reg. U. S. Pat. Off. H6-13

KNOW YOUR BLUE BRUTES

Your Blue Brute Distributor will be glad to show you how Worthington-Ransome construction equipment will put your planning on a profitable basis.

RANSOME EQUIPMENT

Pavers, Portable and Stationary Mixers, Truck Mixers, Pneumatic Placing and Grouting Equipment and Accessories.

WORTHINGTON EQUIPMENT

Gasoline and Diesel Driven Portable Compressors, Rock Drills, Air Tools, Self-Priming Centrifugal Pumps and Accessories.

Get more WORTH from air with WORTHINGTON

BUY BLUE BRUTES

Compressors from 60 to 500 cu. ft. capacity in mountings to suit all jobs. Rock Drills and Air Tools that have always set the pace for easy operation — available in a wide range of weights and sizes.

WORTHINGTON

Worthington Pump and Machinery Corporation, Worthington-Ransome Construction Equipment Division Holyoke, Mass.

CONTRACTORS RUBBER PRODUCTS

available from Stock for immediate Delivery

CONVEYOR, ELEVATOR and TRANSMISSION BELTING all widths and plies

V-BELTS all sizes

HOSE all sizes and types

AIR DISCHARGE STEAM
FUEL COMPRESSOR VACUUM
FIRE PILE DRIVERS SUCTION
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BOOTS, DREDGE SLEEVES, PUMP DIAPHRAGMS, ETC.

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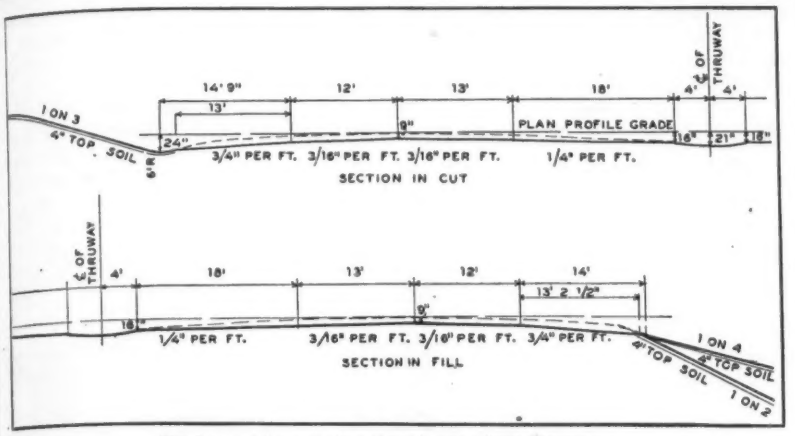


Typical section of the New York State Thruway.

Contracts Let for New York State Thruway

SECTION	COUNTY	LENGTH	TYPE of WORK	COST	CONTRACTOR
Ontario	Onondaga	3.46	Grading and Structures	$ 593,732.95	D. W. Winkelman Co., Inc., and A. S. Wikstrom of Syracuse, N.Y.
Catskill	Greene	2.81	Grading	429,609.00	Grandview Co. of Mt. Vernon, N. Y.
Catskill	Greene	1.18	Grading and Structures	688,497.00	Green Island Construction Co. and Victor Arzani Contracting Co. of Green Island, N. Y.
Catskill	Ulster	3.63	Grading and Structures	777,975.50	Grandview Co. of Mt. Vernon, N. Y.
Ontario	Ontario	4.00*	Grading and Structures	1,958,856.15	S. J. Groves & Sons Co. of New York City.

*Includes reconstruction of 1.82 miles of Route 96

Contracts Advance Thruway in New York

(Continued from preceding page)

minimum right-of-way of 200 feet, and will carry opposing arteries of traffic separated by safety malls 20 feet or more in width. At first each artery will have a 25-foot pavement of 9-inch concrete divided into two lanes: 12 feet on the outside for slower moving vehicles, and 13 feet on the inside for passing and high-speed travel. But enough room will be left for the addition of another 12-foot lane of pavement along the inside edge of each artery when traffic conditions warrant it. Where current traffic conditions demand, the third strip will be included in the initial paving contracts.

Even with two 37-foot pavements, the central dividing mall will be at least 20 feet wide; otherwise it will be held at 44 feet. This will be seeded and planted when the paving is done. At the midpoint of the mall the grade is being depressed 21 inches below that of the adjoining pavement for drainage purposes.

The roadway will have a foundation course of run-of-bank gravel at least 12 inches deep, and extending a foot beyond the edge of the pavement on each side. The gravel course will be extended with an 8-inch thickness underneath the outer shoulder, which will have a minimum width of 10 feet in earth sections or 9 feet in rock sections. After the initial construction, the inner shoulders will be 18 feet wide, but this distance will be lessened to 7 feet when the third lane is added.

In the fill sections, the slopes will be either 1 on 4 or 1 on 2. In the cuts the roadside ditches will be 2 feet deep with bottoms rounded to a 6-foot radius. The 1 on 3 backslopes will also be rounded off at the top. All slopes will be covered with 4 inches of topsoil and seeded with grass. In rough terrain, such as in side-hill work, the arteries may be widely separated, but the pavement will be kept at least 78 feet inside the right-of-way line.

Safety features are stressed in the design. A minimum sight distance of 1,000 feet is required, and no curve is permitted with a radius less than 2,800 feet. The maximum grade is 3 per cent. The present speed limit on New York state highways is 50 mph, but this is expected to be raised on the Thruway because of its design for safe, high-speed travel. Devoid of traffic lights, the new route will also have no grade intersections; other highways will go over or under it by means of bridges or underpasses. These structures are designed so that the full cross section of the Thruway is maintained, with no narrowing of arteries or shoulders permitted.

Thruway access and egress will be via accelerating and decelerating lanes at appropriate points. These lanes will be long enough for the incoming vehicle to pick up speed as it travels along parallel to the Thruway, and gradually merges into the flow of traffic. The same procedure will be employed on leaving, when the cars can slow down on additional decelerating lanes until a cloverleaf or intersecting road is reached. These long, parallel lanes are designed to produce the minimum of

(Concluded on next page)

THE STRONGEST GEARED POWER FOR ITS WEIGHT IN THE WORLD

The Biggest Little Hoists in the world for use where power is not practical, available, or sufficient.

2-Ton "Lightweight"	75 ft.	1/4"
5-Ton "General Utility"	250 ft.	3/8"
15-Ton Triple-Geared "Special"	1200 ft.	1/2"

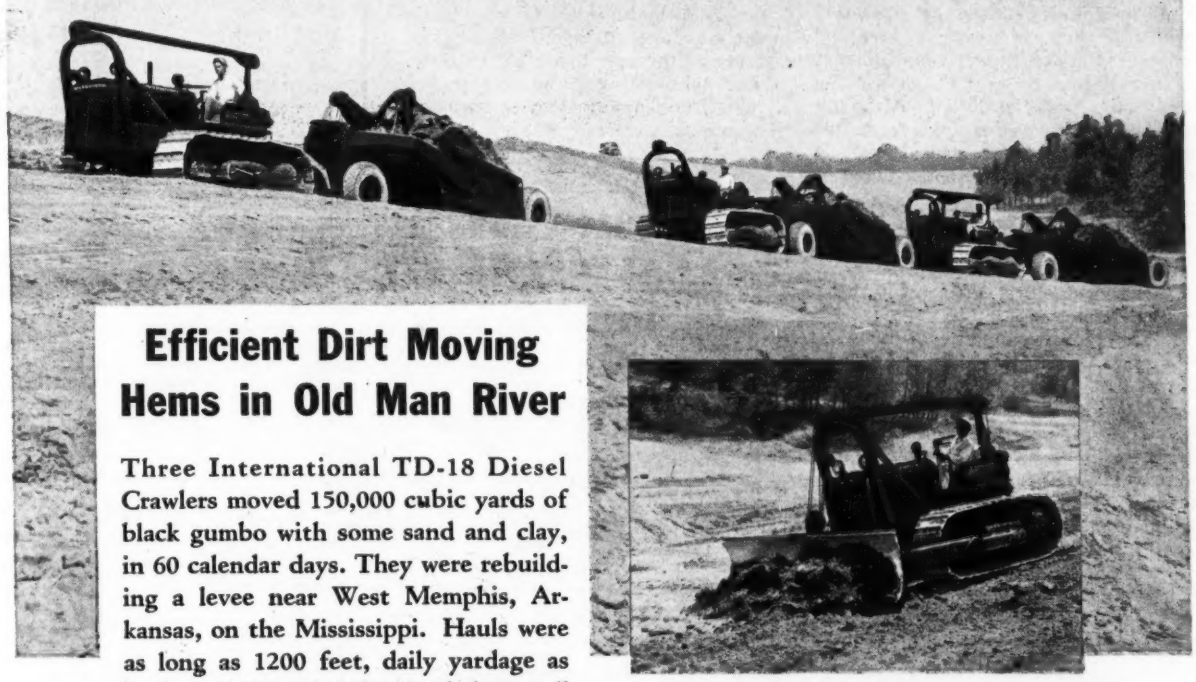
With patent gear change and positive internal brake that never fails, and will lock load.

Gear Ratios	Weight	Price
2-Ton 4 & 22 to 1	60 lb.	$ 50
5-Ton 4 & 24 to 1	110 lb.	75
15-Ton 4, 19 & 109 to 1	680 lb.	250

BEEBE BROS.
2724 6th Avenue So. Seattle 4, Washington

Your Best Bet for Levee Work

INTERNATIONAL Diesel Crawlers



Efficient Dirt Moving Hems in Old Man River

Three International TD-18 Diesel Crawlers moved 150,000 cubic yards of black gumbo with some sand and clay, in 60 calendar days. They were rebuilding a levee near West Memphis, Arkansas, on the Mississippi. Hauls were as long as 1200 feet, daily yardage as high as 30,000. And they loaded at small borrow pits *without pusher assistance* to get capacity loads in 10-yard scoops.

Performance like this points up the superiority of International Diesels for earth-moving. Their 4-cyle valve-in-head engines provide dependable, economical power. Perfect weight distribution, adequate ground contact, rugged construction and extremely durable moving parts give them the ability to handle the toughest earth-moving jobs with ease.

Their built-in, quick-starting system means that they waste no time getting to work. And the little time required for maintenance means *more productive hours in every day.*

This International TD-14 with Trail-builder is shown leveling a haul road on approach to the levee. It also dressed the levee to grade and leveled off the dirt deposited by the three TD-18's and scoops. This is a fast, powerful and easy-to-handle Diesel Crawler —ideal for this work.

Yes sir! Your best bet for levee work, as for other earth-moving, is the International Diesel Crawler. Get the latest information, facts and figures on International Crawlers, Wheel Tractors, Power Units and Diesel Engines now in production, from the International Industrial Power Distributor near you.

Industrial Power Division
INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue, Chicago 1, Illinois

Tune in James Melton on "Harvest of Stars" every Sunday, NBC Network

INTERNATIONAL Industrial Power

CRAWLER TRACTORS • WHEEL TRACTORS • DIESEL ENGINES • POWER UNITS

Contracts Advance Thruway in New York

(*Continued from preceding page*)

difficulty and the maximum of safety.

Another safety feature includes appropriate planting on the central malls, where necessary, and particularly on curves, to screen out approaching headlights. This will be done so as not to interfere with the piling of snow on the dividing strip when the road is cleared for winter driving. In all planting and seeding, only grasses and shrubs indigenous to the region will be used. Thus the natural beauty of the countryside will be preserved and any scars left from the construction operations will be covered. Outdoor advertisers have agreed not to erect billboards just outside the right-of-way limits of the Thruway, except in those areas which have been already designed for commercial purposes by local zoning boards.

Serves Population Centers

Following the natural water-level route for its entire distance, this twentieth-century counterpart of the Erie Canal will tap centers of population where live 90 per cent of the state's 13,500,000 residents. Annual traffic counts show that the present highways in this area have reached the saturation point; that they are no longer adequate for present and future needs; and that an entirely new route is the only solution to the traffic problem. Although the Thruway by-passes these large urban centers, the connecting links are very short. They will be constructed to handle a large volume of traffic speedily and safely. The Thruway's economic significance is evidenced by the fact that several large industrial organizations are seeking factory sites near these large centers of population.

Within a band extending 30 miles on either side of the Thruway lies 50 per cent of the area of the state, including the bulk of its industry and commerce. Other figures show that in this belt are registered 81 per cent of the state's motor vehicles. Nearly 90 per cent of all monies collected by the State for vehicular and operators' licenses are obtained in the same area.

New York State's five-year highway plan, which includes the Thruway, highways, arterial routes, parkways, railroad-grade-crossing eliminations, and reconstruction, is under the supervision of Charles H. Sells, Superintendent of Public Works, with B. D. Tallamy, Deputy Superintendent, and T. F. Farrell, Chief Engineer of the State Department of Public Works.

Power Take-Off Line Has Three Capacities

Large-scale production of its line of heavy-duty power take-offs has been announced by the Davey Compressor Co., Kent, Ohio, for 1947. These take-offs use an internal and external gear drive operating as a strong and durable spline, the manufacturer says. Installation is made to the rear of the truck transmission case; the power take-off becomes an integral part of the drive-shaft assembly for transmitting power direct from the truck engine either through V-belts or chain drive.

The line will include eight models in 50, 75, and 100-hp capacities. The Model 50 is manufactured in a single and a simultaneous-drive design; this permits operation of truck, individual operation of driven equipment, or of both simultaneously. The 75 and 100-hp models have, in addition, a double drive. This permits the truck to be operated alone, either of two pieces of driven equipment to be operated individually, or both pieces of driven equipment to be operated simultaneously.

Some of the uses to which the Davey power take-off may be put include driving truck-mounted air compressors, generators, concrete mixers, pumps, rock crushers, etc.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 17.

Post and Paint Shortages Affect Road Maintenance

Removal of war restrictions on repair and installation of guard rails along highways finds the Kentucky Highway Department unable to buy posts or paint, according to the Commissioner of the Department. More than 10,000 loca posts are needed for replacements o new erection. But those who normall supply them are not bidding.

The same shortage applies to pain both for traffic direction signs and th guard rails themselves. Paint shortage have limited the type of work of th Maintenance Division which is normall carried on during the winter months renewing guard rails, sign posts, an other work not identified with actua surfacing and grading.

You can quickly and profitably trowel a smooth, resilient, long-lived surfacing right over that old concrete or wood floor.

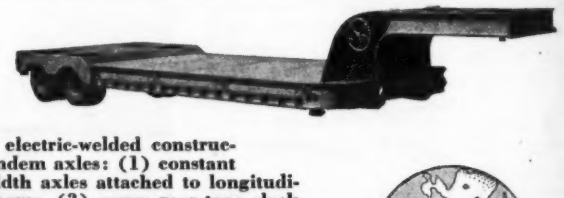
with PLASTIC ROCK!

Plastic Rock comes complete, packed in barrels. Nothing more to buy. No application "formula" to confuse. Simply mix and trowel right over old floor; average depth one-half inch. Old floor Saturday is a new floor Monday. Plastic Rock is absolutely spark-proof, skid-safe even when wet, dustless, silent. Feels like cork under foot. Cannot splinter, crack, crumble, curl or loosen. Also patches concrete to a perfect feather edge. Heavy loads on steel wheels actually improve it. Five-year-old floors show no wear. Used by largest railroads and industries in America. . . . Over 600 contractors have found Plastic Rock a wonderful good-will builder and profit source. No special equipment needed.

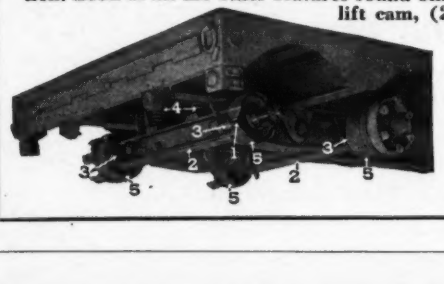
Ask for comprehensive and convincing Report 220-C-2

UNITED LABORATORIES, INC.
16815 EUCLID AVENUE • CLEVELAND 12, OHIO
In Canada—STORRAR MFG. COMPANY, Weston, Ontario
Representatives everywhere, including foreign countries

BE SURE YOUR NEXT TRAILER HAS *ALL* THESE FEATURES



• Deep, wide flange main beams running the full length of the trailer, I-Beam sections for cross-members and outriggers, improved, fabricated gooseneck, and all electric-welded construction. Look at all the other features found only on Jahn tandem axles: (1) constant lift cam, (2) two full-width axles attached to longitudinal rocker beams, (3) worm gear type slack adjusters at each wheel, (4) heavy coil springs at each axle and (5) positive equalizing braking at each wheel regardless of position of axle.



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JAHN TRAILERS ALL OVER the WORLD!

Heavy duty trailers from 5 to 100 tons.

BEST ROAD SPREADER

Say Men who Build and Maintain Highways

- Spreads all materials to 1", wet or dry
- Spreads thick or thin
- Attaches to truck as tailgate
- Does not limit use of truck to spreading
- Controlled from cab with clutch
- Starts spreading with truck in motion
- No helper required
- Stops spreading with truck in motion
- Spreads forward or backward
- Half or full width of street
- Reduces number trucks required
- Positive uniform spread
- Fits any dump truck

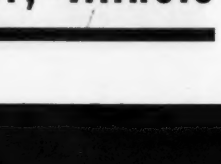
SELF-FEEDING FLINK

For literature and name of our distributor nearest you, write

Flink Spreader with safety protective housing over spreader blades and clutch. Hydraulic drive and rear wheel chain drive models.

Sand-Chip Attachment

The ideal machine for seal coating, road re-surfacing, dust control. Trouble-free, no working parts to attachment.



THE FLINK COMPANY, Dept. 674, Streator, Illinois

CUMMER
ASPHALT PLANTS
EIGHT SIZES
Up to 1000 Tons per day
DRYERS
Two-Fire and Internal Fire
30 to 100 Tons per hour
Electric Batch Timers
50 Years' Experience

THE F. D. CUMMER & SON CO.
EAST 17th & EUCLID
CLEVELAND 15, OHIO

The chute on the latest model of the Dumpcrete is permanently attached in pouring position and needs only to be unfolded for use.

Chute Design Speeds Placing of Concrete

A change in the chute on Dumpcrete units has been made by the Maxon Construction Co., Inc., 131 No. Ludlow St., Dayton 2, Ohio. The Dumpcrete is a specially designed truck body for hauling and placing air-entrained and other low-slump concrete.

In the new design, it has been possible to attach the chute so that it is always in pouring position; it requires merely unfolding for use, and refolding after the pour. Previously, the chute sections had been carried on the side of the body or the rear of the cab, and it was necessary to place them in position for each pour and replace them afterwards in the carrying position.

The 5-foot folding chute has a 180-degree swing and full vertical adjustments. The other features of the Dumpcrete remain the same.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 18.

Construction-Job Scaffold Equipment

A scaffold designed for saving time is offered to the construction industry by Superior Scaffold Sales Co., associated with Construction Machinery Sales Co., Waterloo, Iowa.

The Model B scaffold is 5 feet 8 inches wide, with a raised material platform which keeps material and tools at the worker's finger tips instead of his feet. Another feature, said to be a time-saver, is the removal of cable and drums away from the wall and behind him.

The Model A is 8 feet 4 inches wide, and has all the features of the Model B. Moreover, its added width permits materials to be transported along the outside edge instead of being loaded from the inside, the manufacturer says.

The Model C scaffold is a light-cleaning and tuck-pointing type. It may be hung from a structure of any height. It is claimed that the effort of raising and lowering is the same from the top as from the bottom.

The line of Superior sectional scaffolds also includes types for masonry work, painting towers, etc.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 19.

Thornton Changes Name

Announcement has been made that production of the Detroit-NoSpin differential for use on trucks has been increased to 4,000 units a month, minimum. It is made by the Detroit Automotive Products Corp., formerly the Thornton Tandem Co. The differential is distributed nationally by The Truckstell Co., Cleveland, Ohio.

The unit is designed to increase traction and to prevent trucks from stalling as a result of one wheel spinning, because it propels both driving wheels of a truck axle at identical speeds, even when traction is lost on one. Since each wheel has independent drive, the pulling ability of the wheel with traction is not reduced to that of the slipping wheel, according to The Truckstell Co.

The unit may be purchased as original equipment, or as a replacement.

Paving-Breaker, Digging, And Rock-Drilling Tools

A line of paving-breaker, rock-drilling, and digging tools is described in Bulletin 52239 of the Bicknell Mfg. Co., 12 Lime St., Rockland, Maine. The bulletin features line drawings of all the tools in the line, which are run next to tables giving dimensions and specifications for each type of tool.

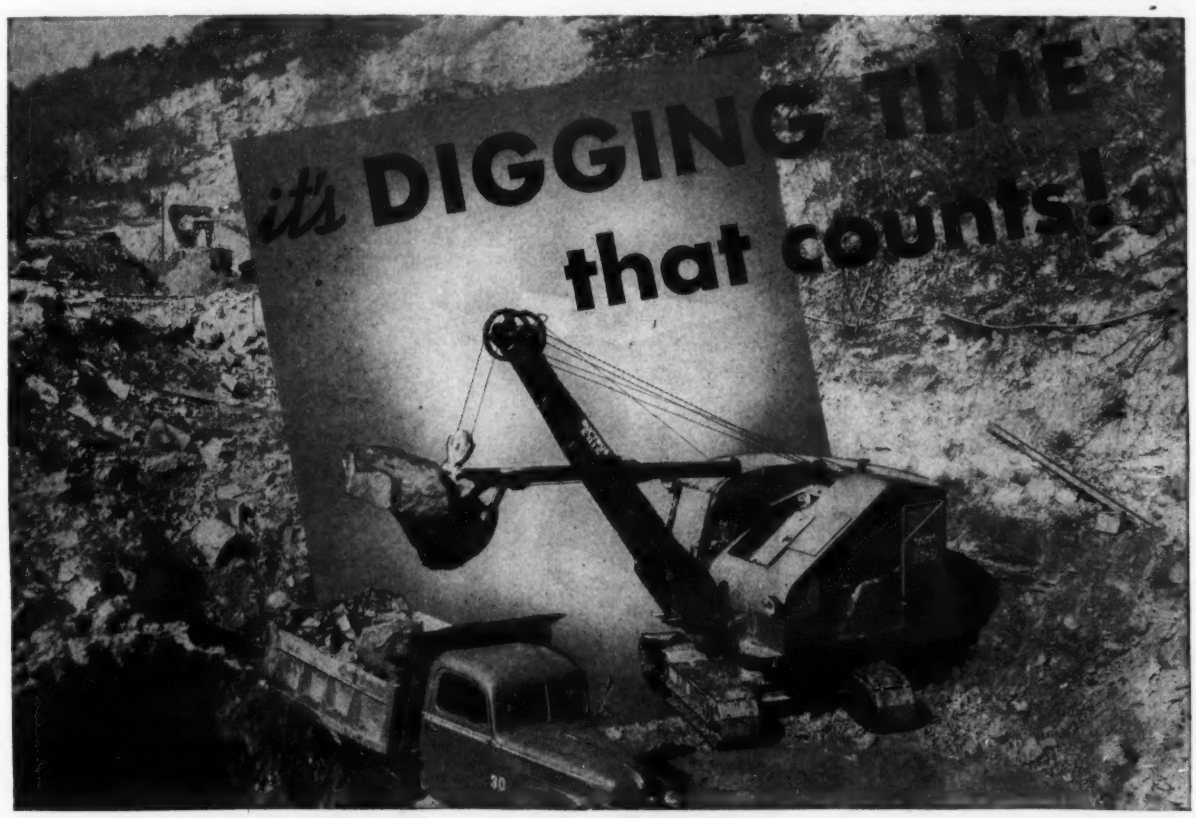
The inner page lists the chisels, chisel bits, moil points, asphalt cutters, wedges, solid drill steels, clay spades, dirt tampers, tamper shanks, and drivers. The last page features detachable-bit drill rods, plug drills, plug-drill bits, and hollow drill steel with forged bits.

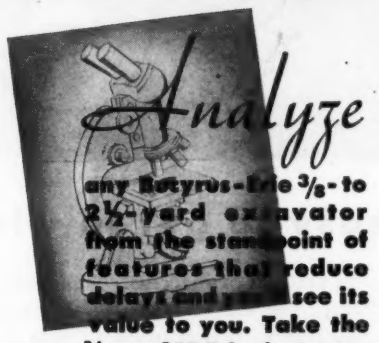
Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 80.

AD 164

Everybody has commented on the really beautiful four color illustrations contained in the VICTOR Bulletin Form 20 . . . it covers fine welding and cutting equipment . . . it will be yours, free, for the asking. Write us today for your copy.

VICTOR EQUIPMENT COMPANY • 844 FOLSOM ST., SAN FRANCISCO 7, CALIF.





Analyze any Bucyrus-Erie 3/8- to 2½-yard excavator from the standpoint of features that reduce delays and you'll see its value to you. Take the ½-yard 15-B for instance:

MOBILITY: The 15-B is easy to steer in sharp or gradual turns and there's plenty of power to climb grades up to 30%. Time spent in moving is cut to a minimum.

MATERIALS: Only controlled-quality materials, properly treated, are used.

WEIGHT: The lightest weight consistent with ample strength is maintained throughout so that stresses on all parts of the machine are kept at a minimum. The 15-B, like all other Bucyrus-Eries, is individually designed for its work.

PERFORMANCE: The smooth, quiet performance of the 15-B—obtained with widespread use of anti-friction bearings, oil enclosed gears and accurate alignment—means less maintenance, reduces operator fatigue, and increases digging time.

ADJUSTMENTS: All adjustments, including singlepoint adjustments on clutches and brakes are easily made and stay put for long periods.

ACCESSIBILITY: Parts are large, simple, few in number, easy to get at for replacing. Lubrication fittings are easy to reach, hard to miss.

CONTROL: All operating levers, including lever for positive digging lock, are grouped at the operator's position. There are no time-wasting delays caused by the operator's having to leave his normal position.

CYCLE: All functions are balanced and synchronized so that there is no overstressing of any part or parts to cause too-frequent adjustments and excessive wear.

64E46

you make the most of EVERY HOUR with a BUCYRUS-ERIE

BUCYRUS-ERIE COMPANY • SOUTH MILWAUKEE, WISCONSIN

The new Concut Jr. machine cuts out sections of 6-inch concrete pavement preparatory to patching.

New Concrete Cutter

A new machine for cutting concrete pavement has been developed by Hurstco, Inc., 323 Parkway Bldg., 117 E. Colorado Blvd., Pasadena 1, Calif. According to the manufacturer, it can be used for removing sections of concrete for patching or replacement, cutting non-slip grooves, cutting joints, curbing, cutting trenches for installation of plumbing, and similar jobs.

Operated by one man, the Concut Jr. is mounted on four wheels with heavy bearings. Blades are available in sizes from 8 to 18 inches. In operation, the blades are cooled by water from a tank mounted on the machine. Power is furnished by a Wisconsin one-cylinder air-cooled Type AHH 9.2-hp engine.

The machine has an adjustable gage to determine the depth of cut as well as to furnish a means of following a line for a straight cut.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 20.

New AC Arc Welder

A new ac arc welder has been announced by The Lincoln Electric Co., P. O. Box 5758, Cleveland 1, Ohio. This new Fleet-Arc is manufactured in 200, 300, and 500-ampere ranges. It is equipped with an arc booster said to augment the current the instant the arc is struck. The arc is started automatically the moment the electrode touches the work. This feature of the new welder has been accomplished without the use of special high-frequency devices or higher voltage.

A selector switch on the front of the welder governs the amount of booster current to be used in striking the arc. The arc booster, it is claimed, enables the operator to achieve the maximum depth of penetration in every job, and helps him attain the maximum depth at the beginning of the weld.

Current control, continuous and self-adjusting, is provided by the rotating reactor control, which affords fast setting throughout the range of the welder. The amperage is indicated on a calibrated dial on the face of the welder. The reactor current control is held in position by cone brakes and is actuated by a self-cleaning chain drive. Thermostatic control, which opens the magnetic starter when overloaded, provides a high degree of self-protection for the operator, Lincoln says.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 21.

Rust-Preventive Paint

A broadside describing a paint that can be applied over rust without scraping or brushing has been made available by Speco, Inc., 3142 Superior Ave., Cleveland 14, Ohio. The manufacturer states that Rustrem can be applied as a rust preventive, or over rust to prevent further rusting. It is said that Rustrem penetrates the rust surface, incorporates it in the paint pigment, and thereby renders it inactive.

The broadside describes how to apply the paint, as well as giving many suggested uses. Also listed are the other chemical and specialty products made by the company.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 81.

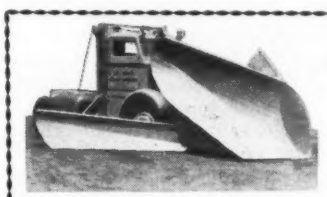
McKiernan-Terry Acquires Mead-Morrison Division

An agreement under which McKiernan-Terry Corp. has acquired the good will, drawings, jigs, fixtures, and spare parts of the Mead-Morrison Division of Robins Conveyors, Inc., has been announced by officials of both companies.

Under the agreement reached, the two companies will cooperate in carrying out important harbor-facility projects which involve problems of bulk-materials-handling equipment. Robins will continue its rapidly expanding line of conveyors of all types, and McKiernan-Terry will handle the principal products of Robins' former Mead-Morrison Division. These consist of loading towers, ore bridges, man trolleys, grab buckets, car dumpers, and car and barge haul machines.

McKiernan-Terry is well known to the trade as a manufacturer of coal-loading towers, gantry cranes, and contractors' equipment. It has an engineering organization and heavy-tool equipment well suited to the manufacture of the Mead-Morrison line. The key personnel formerly connected with Robins' Mead-Morrison Division are now associated with McKiernan-Terry.

Close cooperation between the two companies will better enable them to serve the trade, they feel. The agreement contemplates no change in the financial set-up or stock ownership of the respective companies.



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REX CONSTRUCTION MACHINERY

Dirt-Moving Program For Soil Conservation

Many Million Yards Moved By Contractors to Improve Drainage in Important Agricultural Area

♦ ONE of the most important but least publicized construction activities of a Governmental department is the dirt-moving program of the Soil Conservation Service of the U. S. Department of Agriculture. It has been said that 1946's record-breaking crops were designed by God Almighty, with an eye to price control. He was helped by the Soil Conservation Service engineers and several dirt-moving contractors.

Perhaps one of the most important of all Soil Conservation Districts is the one at Fargo, N. Dak., in the heart of the Red River Valley. Nature's rules are simple there. The farmers either get rid of 20 inches of rain each year when it falls, or they don't raise a crop. It is as elementary as that.

Wet and dry climatic cycles recurring in the Red River Valley have now made mandatory the enlargement of the 40-year-old system of drains. A drainage program which started in 1943 is now at its peak, and has been largely transferred from district machines and manpower to local dirt-moving contractors on unit-price bids. Drainage ditches with carrying capacities up to 500 cfs and bottom elevations 10 feet below the flat blackland are under construction. Many of the existing small laterals are being cleaned and others built.

Drainage Earthwork

In the past year some fairly large dirt-moving jobs were let by contract. The Fargo Airport cut-off involved 47,361 cubic yards of common excavation loaded by dragline and hauled by trucks at a cost of 37 cents per cubic yard. Excavation in Big Slough No. 3 of the Cass County Drain called for 65,850 cubic yards of cast excavation at 21 cents. On that job, 20,018 cubic yards was dug and hauled for 32 cents. Leveling the slopes after excavation was bid in at $300 per mile; it was all bulldozer work. On Cass County Drain No. 10 the contractor moved 128,082 cubic yards for 15 cents per yard, all cast by dragline.

The work has attracted the attention of some reputable and excellent highway contractors in the vicinity, including Megarry Brothers of St. Cloud, Minn. Frequently some industrial concern with a dragline or crane not busy for a few months bids on work.

Aim of Program

Soil-conservation drainage is irrigation in reverse. Irrigation engineering consists of the admittance of a known quantity of water to the land. Soil-conservation drainage consists of draining an unpredictable amount of water from the land without ever knowing when the deluge will fall. It is a battle of unknowns.

C. & E. M. Photo

Bad sloughing in on this year-old ditch proves the Soil Conservation Service theory that berms are needed to take the levee bank weight off the ditch slope.

The great Red River Valley is a strip of land 163 miles long and from 15 to 40 miles wide. Tributary streams such as the Sheyenne, Rush, Ottertail, and Wild Rice Rivers crisscross the valley and empty into the Red River. They pre-date the glacial period when the bottom of the valley was covered with ice, which later thawed and became

(*Continued on next page*)

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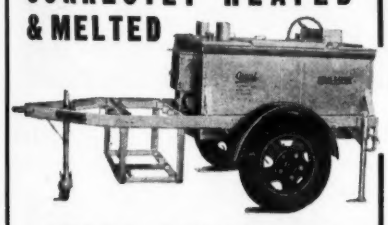

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ROAD MACHINERY DIVISION

WAYNE, MICHIGAN

Dirt-Moving Program For Soil Conservation

(*Continued from preceding page*)

Lake Agassiz. Now that great area is divided into six North Dakota counties: Cass, Traill, Grand Forks, Walsh, Pembina, and Richland. Minnesota counties border the right bank.

Back in 1905 the lack of comprehensive drainage was so acute—North Dakota was in a wet cycle—that delegates to the Second State Irrigation Convention held at Bismarck passed a resolution requesting the Office of Experiment Stations of the U. S. Department of Agriculture to make surveys, recommendations, plans, and reports with adequate drainage in mind. In 1906 Engineer John T. Stewart made the first surveys and designed for the Red River Valley a drainage system, which is still in use today.

It has not been possible to improve on the Stewart system after 40 years.

Design of Drain Channels

In an effort to standardize as much as possible on high-quality adequate drainage systems, the Soil Conservation Service Regional Office at Lincoln, Nebr., has developed some common-sense rules to be used in conjunction with Stewart's formulae and designs. These policies govern the design of all drainage channels today in the Fargo District. Design engineers bear the following rules in mind:

1. A drain-channel outlet must have a capacity equal to or greater than the inflow of the system. Further, the drain channel must be designed in a manner to reduce *or eliminate* soil erosion.

2. Enough surveys must be run to insure that all areas can be adequately drained by laterals.

3. Dikes must be planned at critical low points to restrict or prevent overflow.

4. All channels must be kept as straight as possible to develop their full carrying capacity. Where curves are necessary the radius should be kept as great as possible.

5. Drain channels should be located in the lowest possible areas to keep excavation quantities down and to facilitate bottom-land farm drainage.

6. The soil-conservation designer should avoid drains that cut the corners off farms, making these corners inaccessible.

7. If possible, property lines should be used for final channel locations provided this fits in with the above rules.

8. Ditch capacity should be determined by Manning's or Kutter's velocity formulae, *but common sense must govern.* Velocities of 4 feet per second may be safe in dense clay or gumbo, but half that much will be destructive in sand or silt.

9. Berms at least 12 feet wide must be built in to the larger mains to prevent the weight of the spoil bank or levee from caving in the sides. On smaller laterals 8-foot berms are sufficient. Side slopes of 1½ to 1 are safe in clay or heavy soil. Lighter soils may require 2 to 1 or even 3 to 1 side slopes. Loess will stand almost vertically.

Problem in Fargo District

The design of drainage channels in the Fargo District is a battle with one of the most aggravating conditions to be found anywhere, on account of the level floor of ancient Lake Agassiz. Precipitation on the high glacial moraines towards the west runs down on the Red River Valley floor. If this water is not drained off immediately, it will flood and ruin a crop in 24 hours. In late years destructive rains in July and August have made quagmires out

(*Continued on next page*)

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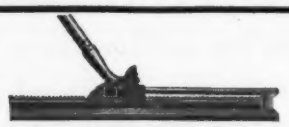

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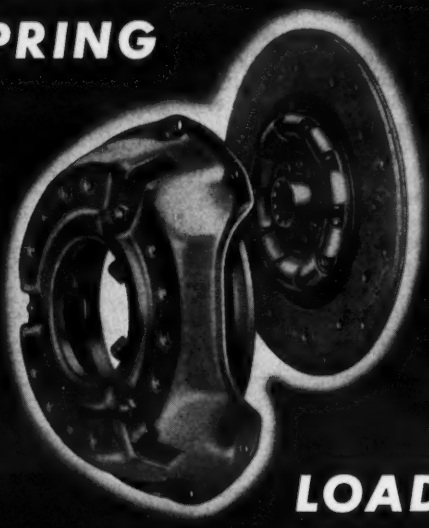

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Dirt-Moving Program For Soil Conservation

(*Continued from preceding page*)

of farm land, and excellent crops were impossible to harvest.

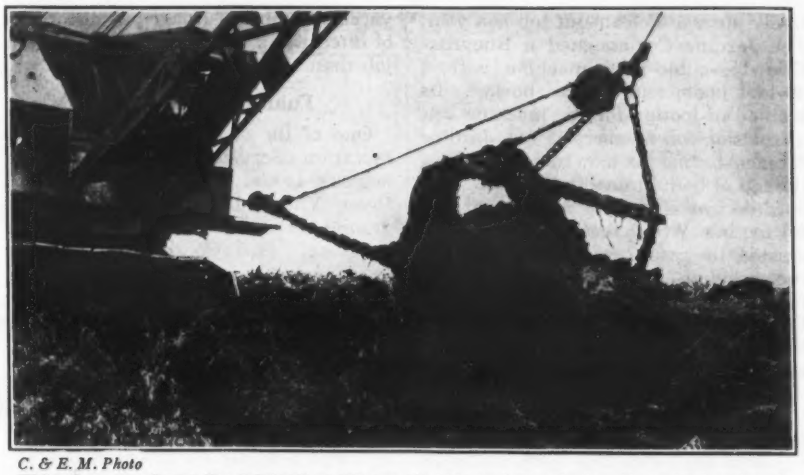
Channel designers have had to run ditches to the Red River with slopes as flat as 0.0002. That is only about ⅛-inch fall per 100 feet of distance. By digging these mains deep, they have made good drainage possible when the Red River is at a comparatively low stage. High water on the Red River may back water up in the drain system, but protective levees or dikes prevent any overflow. Fortunately the Red River is a stream which runs floodwater out at a rapid rate. And the design of deep drains is now correcting the heart-breaking situation which lost five successive crops to North Dakota farmers in that many years.

The present flurry of activity followed the period of lethargy of the 1930's, when North Dakota was plagued by drought. The old drains which Stewart designed so many years ago grew up in weeds and trees, then, and people were wont to say, "Building them was a waste of public money".

The wet cycle returned about 1939, and by the time a really serious program was contemplated, the nation was already engaged in the pre-war defense-construction program. With the help of the Agricultural Adjustment Administration, the districts managed to secure six small draglines, all under 1 cubic yard in capacity. These machines were put to work cleaning the sides of the old ditches and digging a few new channels where the need was most urgent.

With the end of the war, the construction program has increased rapidly, and a breakdown of work performed in the year of 1945 alone proves the trend towards contract construction. In that year the districts in the Red River Valley moved 1,716,916 cubic yards. Of that total 1,156,246 cubic yards was moved by contractors.

Of the new legal drains, 29.8 miles were built in 1945 for a total of 301,263 cubic yards; 23.65 miles of new non-legal drains accounted for 207,087 cubic yards. Some 38.02 miles of old drains were cleaned, and 500,000 cubic yards of dirt was moved in the process. The same amount of yardage accounted for 294.1 miles of farm drains, and another 105,279-yard item was tied up with pot-hole drainage.



C. & E. M. Photo

This close-up shows the fairlead on Megarry's 1¼-yard Lorain dragline which reduced vibration and cable whip. Note how the sticky mud hangs to the Page dragline bucket.

The Soil Conservation Service has approached its problem in the Red River Valley not with the attitude of cramming a theoretical improvement down the farmers' throats, but with the idea of helping them when help is requested. It has been the practice under state law for farmers to form Soil Conservation Districts. Such a group has full authority to make plans and recommendations, to hold hearings; in fact, to do about everything except levy taxes.

When drainage improvements are desired by one farm owner, he makes his request to the Soil Conservation District Board. The men with whom he does business on this board are his own friends and neighbors. Not until this board recognizes the request does the Soil Conservation Service come into the picture.

All design, engineering, and construction supervision is a function of the Soil Conservation Service when the Soil Conservation District notifies it officially. A large part of farm drainage construction has been underwritten by the AAA. Financial assistance from the State Legislature in the amount of $350,000 on the large legal drains has been an important factor in getting the

(*Continued on next page*)

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Also, the operator can *see* where he's going from the high DuoMix platform . . . and that makes every paving operation easier, faster and less strain on valuable operating personnel.

Add: Fast-charging, self-cleaning skip; full-automatic mixing cycle; high-speed bucket travel; Foote Double Cone drums and No-Pressure water system; *and* typical Multi-Foote dependability on years of jobs ahead.

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Your MultiFoote Dealer has full information on the MultiFoote DuoMix 34-E . . . or write us direct for the new DuoMix Catalog.

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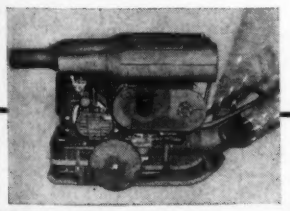

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C. & E. M. Photo
M. E. Hoffman, left, Drainage Engineer of the Soil Conservation Service, and Charles Megarry of Megarry Brothers inspect some of the drainage details on Megarry's job.

Dirt-Moving Program For Soil Conservation

(Continued from preceding page)

work under contract. The Soil Conservation Service depends on routine Congressional appropriations for its operating funds, which are used only to supply technical assistance to the districts.

Megarry Brothers Contract

Megarry Brothers' 1946 contract involved about 200,000 cubic yards of clean-out excavation along an established drain. One of Megarry Brothers' oldest highway draglines, a Lorain 1¼-yard machine, was rebuilt especially for this work. Under the supervision of Charles Megarry, the Lorain cab was lengthened so a Caterpillar D8800 diesel engine could be installed. The driving gears, turning circle, and brake drums were overhauled. A 50-foot boom was installed.

The rejuvenated machine was hauled out and walked up to the top of the levee. Since so much of the terrain is soft, Megarry has found it best to walk the machine in on existing grass or weeds. In case of rain, a machine on weeds will continue to dig, where one sitting on a bulldozed area will mire down.

The stock performance figure which everybody in the Red River Valley shoots for is 100 cubic yards an hour. Nobody ever quite makes it. The best Megarry Brothers has been able to do has been 75 cubic yards an hour, with the machine swinging 90 degrees or less. The digging position of the Lorain machine is at right angles to the tracks, with dumping more or less parallel.

Excavated dirt was used by Megarry Brothers to make a new levee on both sides of the ditch. Where very wet gumbo was dug, the material was dumped over a wide area almost to the edge of a cornfield. Far from making farmers angry, this method of disposal is quite popular. A wide expanse of levee can easily be leveled off by agricultural equipment, and crops can be grown right to the edge of the ditch.

While the Megarry Brothers contract was located in the soggiest terrain of all, its machine was cleaning out from 40 to 50 linear feet of ditch per operating hour. The firm used a Page automatic dragline bucket. Page buckets have demonstrated in this territory that they will come out with a good load and dump the sticky material clean. Hendrix perforated buckets have also been used with a great deal of success.

Other Contract Work

Jardine Bridge Co. of Fargo also actively pushed a clean-out job last year. The Jardine Co. assigned a Bucyrus-Erie 1½-cubic-yard machine with a 60-foot boom and a Page bucket. Its method of footing for the machine was a revision of Megarry's, for Jardine hired a farmer to mow a swath along the top of both drain-ditch banks. But Jardine was also using the natural turf for footing. Where really uneven places existed, they were easy to iron out with the dragline bucket as the machine moved forward along the levee line. Performance of the Bucyrus-Erie machine was 400 feet in an 11-hour run, accounting for 770 yards per shift.

A third contract was held by William Collins & Co. of Fargo. Collins used an Osgood 1¼-yard machine and a Bucyrus-Erie 21-B dragline, both equipped with 1¼-cubic-yard Hendrix perforated buckets. Collins' contract was located in solid footing on a ditch where it was possible to excavate both sides and the bottom on one pass. Collins' machines both approached the 100-yard-an-hour estimate, but did not reach it by 10 yards an hour. Yardage per linear foot of ditch ran a bit higher on the Collins job than the other two contracts.

Future Contract Work

One of the structures the Soil Conservation Service has developed for farmers is the stock pond. The Red River Valley has very little underground water that is potable even for livestock. Soil Conservation Service engineers have introduced an excavated pond, located so it traps all the rainwater in a local watershed. This pond is then fenced by the farmer to keep livestock out of the water, and a gravel trench laid to a pump outside the fence. Water can then be pumped to a livestock drinking trough by the farmer.

The AAA and the Soil Conservation Service, through the medium of Soil

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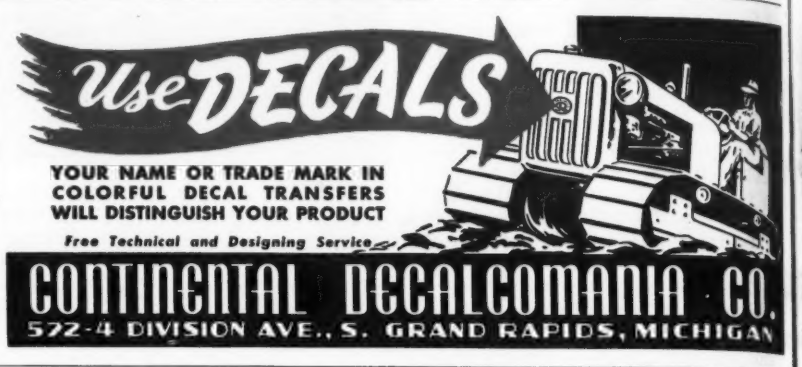
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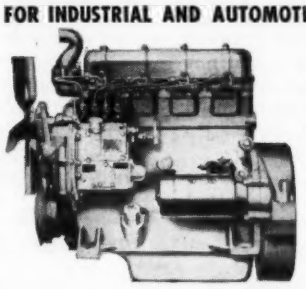
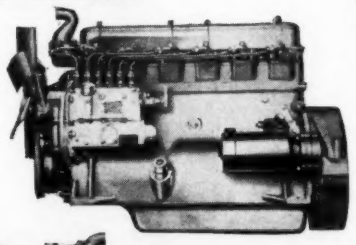
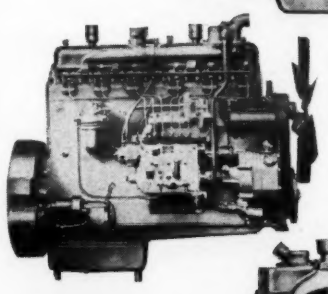


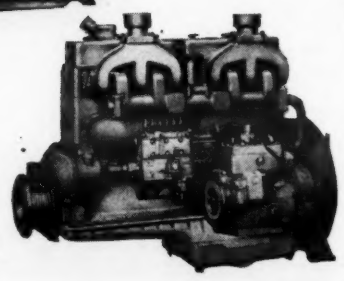
Model 180-DLA
Four cylinders, 3⅜" x 3¾", 134 cu. in. displ.



Model 190-DLA
Six cylinders, 3⅜" x 4", 247 cu. in. displ.



Model 148-DK
Six cylinders, 5¼" x 6", 779 cu. in. displ.



Model 6-WAKD
Six cylinders, 6¼" x 6½", 1197 cu. in. displ.

● Operating for George M. Brewster & Son, Inc., on the Williamsport, Pa., Flood Control Project, this 2-yard Lorain Shovel, powered with a Model 6-WAKD Waukesha Diesel, averaged 2200 yards of dirt for nine hours on 45 gallons of fuel. That's almost 50 yards per gallon of fuel . . . and heavy digging, to boot!

This is a typical example of the fuel economy and power. This new Waukesha Diesel has great acceleration, too, for it makes 3 passes per minute filling a 5-yard truck.

Like all other Waukesha engines, the Waukesha Diesels were not offered to the public until they were thoroughly field-proved and tested. Even before the rumors spread that a postwar Waukesha Diesel was in the making, these engines were in average operators' hands, being tested in climates from sub-freezing to tropic heat, and in services ranging from heavy to light duty, both industrial and automotive. Every test or service condition that could be imposed by users was applied to prove them in advance.

The 4 Waukesha Diesels shown are now ready. All are built for industrial engines, with the 3 smaller models to be available later as automotive engines, as well. They represent the culmination of more than 40 years of heavy-duty engine building in the gasoline engine field, and 20 years of Diesel research and development.

Consult Waukesha engineers on *all* your engine needs. Write for information.

WAUKESHA MOTOR COMPANY
WAUKESHA, WISCONSIN
NEW YORK • TULSA • LOS ANGELES

C. & E. M. Photo
An Osgood 1¼-yard dragline with a Hendrix bucket cleaning as it goes. William Collins & Co. of Fargo used this machine on its recent soil-conservation contract.

Dirt-Moving Program For Soil Conservation

(Continued from preceding page)

Conservation Districts, are constructing a number of these ponds in the more arid regions where surface water cannot be found, and they involve considerable earth work. This type of construction is now attracting contractors with one or two bulldozers and a small scraper.

The program of new construction for the Fargo District is not finished, but already the engineers and farmers have come a long way towards insuring good crops year after year. There may come a day when people can move back into farmhouses long since vacated by those who gave up in despair after floods ruined them year after year.

Personnel

The program at Fargo has been administered by Clinton A. Haskin, District Conservationist, with M. E. Hoffman as Drainage Engineer and W. W. Augustadt as Design Engineer. A. D. McKinnon is State Conservationist for North Dakota, with headquarters at Bismarck.

Winch for Tractors

A winch designed for installation on the rear of Allis-Chalmers M or WM tractors is now available. Made by the Pacific Car & Foundry Co., Renton, Wash., the Model E Carco winch features a free-spooling drum which it is claimed will not jam or snarl at any speed. Shifting is by means of a sliding pinion on the power take-off shaft. Shafts turn in ten double and single-row ball bearings lubricated in a bath of oil to insure maximum efficiency and long life. A hand lever at the right rear actuates a sliding internal gear clutch on a cable drum shaft, which disengages the drum for free spooling.

According to the literature released by the company, the winch draws 18,600 pounds at the rate of 70 fpm using an overwind on a bare drum. This figure is based on a pull of 39.54 belt-hp at 1,200 rpm. Using an underwind, the rate at the bare drum is 13,300 pounds at 98 fpm.

A two-way external contracting brake provides full control of the load at all times, according to the manufacturer. The self-energizing direction of the brake may be changed by shifting the brake push rod. A gypsy spool or cathead can be furnished as an extra when ordered with the winch from the factory. It is driven from an extended cable drum shaft.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 22.

New Dealers for Gradall

The appointment of four additional distributors for Gradall earth-movers manufactured by The Warner & Swasey Co., Cleveland, Ohio, has recently been announced.

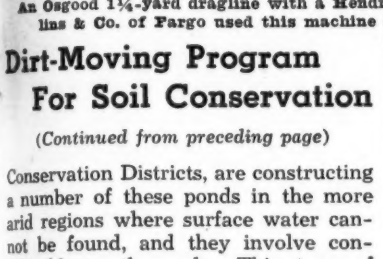
McClung-Logan Co. of Baltimore will distribute the machine in Maryland and southern Delaware. Service Supply Co., Philadelphia, will handle sales in eastern Pennsylvania, southern New Jersey, and northern Delaware. Manwaring Machinery Co., Indianapolis, will distribute Gradall in central and southern Indiana. Golden State Equipment Co. in Los Angeles will service southern California and four bordering counties in Nevada.

Line of 5-Ton Trucks

A bulletin describing its line of 5-ton trucks has recently been made available by the Four Wheel Drive Auto Co., E. 12th and Auto Sts., Clintonville, Wis. This Bulletin 462 has detailed photographs and drawings of the major features of the U Series of trucks. Included are sectional views of the engine and its features, as well as the steering mechanism, transmission, silent-chain power transfer, and the power line which gives drive to all four wheels.

The bulletin also contains on-the-job photographs of the 5-ton truck being used for many different purposes.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 82.



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$7½ billions of heavy construction in 1947! Millions and millions of tons of aggregate will be needed.

Here's the line of modern, portable crushing and screening plants that will help you make more money for producing that aggregate. Every unit is made of the finest possible material and skillfully engineered to assure long, trouble-free operation, low-cost production and flexibility to meet every operating condition.

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- The Cedarapids Junior Tandem is similar to the Master but smaller in size.
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- The Cedarapids Unitized Plant is the most versatile, portable crushing, screening and washing plant ever offered. Will handle rock or gravel, dry or washed—with almost any desired capacity.
- The Cedarapids Portable Hammermill plant is the ideal unit for large production of agstone and road stone.

See your nearest Cedarapids dealer for details. When you buy a crushing plant — buy the best — buy Cedarapids.

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ROCK AND GRAVEL CRUSHERS
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PORTABLE GRAVEL PLANTS
REDUCTION CRUSHERS
BATCH TYPE ASPHALT PLANTS
CONTINUOUS MIX TYPE ASPHALT PLANTS
DRAG SCRAPER TANKS
WASHING PLANTS
KUBIT IMPACT BREAKERS
HAMMERMILLS

Convention Calendar

Feb. 26-28—Eastern Highway Officials.
Annual convention of Association of Highway Officials of North Atlantic States, Hotel Traymore, Atlantic City, N. J. A. Lee Grover, Secretary, State Highway Department, Trenton, N. J.

March 3-5—Highway Conference
Annual meeting, Highway Engineering Conference, University of Utah, Salt Lake City. Prof. A. Diefendorf, Head of the Civil Engineering Department, University of Utah, Salt Lake City 1, Utah.

March 18-19—Highway Conference
Highway Engineering Conference, Ohio State University, Columbus, Ohio. Murray D. Shaffer, Director, Ohio Department of Highways, Columbus 15, Ohio.

March 25-28—N. Y. Safety Convention
Annual convention and exposition, Greater New York Safety Council, Hotel Pennsylvania, New York City. W. F. Brown, General Chairman of Executive Committee, 60 E. 42nd St., New York City 17.

Loader Device Adds Uses to Dump Truck

A hydraulic lifting device for use as a front-end shovel or snow plow is made by the Truk-Loder Co., P. O. Box 515, Tiffin, Ohio. Suitable for installation on any standard dump truck, the Truk-Loder is operated by the truck's regular hoist lever.

The standard shovel has a ½-cubic-yard capacity; it is 6 inches high in front, 20 at the rear, and is 5 feet long. There is also a special shovel of 1.1 cubic yard available. The shovel operates at a height sufficient for loading to other trucks or to railroad gondola cars.

The Model 302 snow plow is the V-type, electric-welded; it has a curved moldboard with cutting edges of high-carbon steel bolted on and replaceable. It is 8 feet 3 inches wide at road level, 9 feet 3 inches at the top, 28 inches high in front, and 58 inches at the outsides. The plow has three ski-type shoes with adjustment for cut-edge wear.

Easily attached or detached to release the truck for regular hauling service, the Truk-Loder may also be used for handling posts, poles, pipe, and similar work.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 23.

Electric Welding Sets

Direct-current welding equipment, built in three models, is featured in a folder issued by Electric Arc, Inc., 152 to 162 Jelliff Ave., Newark 8, N. J., and available to readers of CONTRACTORS AND ENGINEERS MONTHLY on request. Dual-arc gasoline-powered welders have 200, 300, and 400-ampere capacities; diesel-powered models come in 300 and 400-ampere sizes. They can be furnished as stationary models, or as portable 2 and 4-wheel ones. All are equipped with electric self-starters, and are totally enclosed against the elements.

Equipment available for the Dualarcs includes an ac auxiliary generator providing a 110-volt ac power source from 1 to 3 kw for driving small equipment. A shaft extension on the generator can be provided for a power take-off for driving pumps and compressors.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 83.

Scrapers Serve Many Jobs

A bulletin recently issued by R. G. LeTourneau, Inc., Peoria 8, Ill., covers a wide range of Tournapull applications. Bulletin No. TP-126 lists some of the Tournapull features and what they mean to an earth-moving contractor.

The bulletin covers a wide variety of applications under many conditions. There are on-the-job photographs, all captioned with the job description, as well as the figures on earth moved, length of haul, time of haul, etc.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 84.

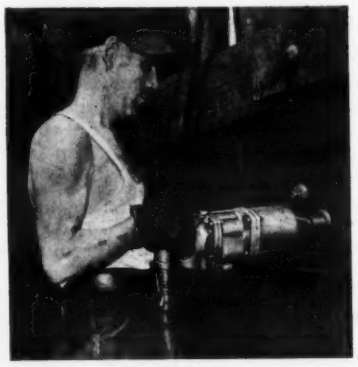
There's always a CP Tool exactly suited to the job

A Leader in its Weight Class

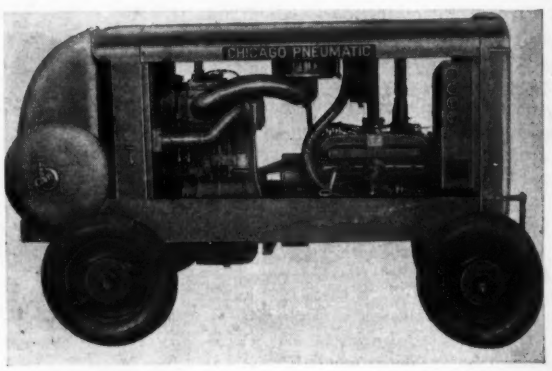
The 56-pound CP-42 Sinker Drill is ideal for general excavation, road work, shaft sinking, and quarrying, because of its penetrating power, fast drilling speed, strong rotation and good hole cleaning qualities. Its low air consumption makes it especially desirable for use with portable air compressors. CP Sinker Drills range from the 28-pound CP-22 to the 119-pound CP-60N.

Three Models of CP Backfill Tampers

CP has a pneumatic Backfill Tamper exactly suited to any particular job. CP-3 for medium heavy jobs; CP-MM for all general heavy backfill tamping; CP-4 for extra heavy work, as in earth dams. In trench work, especially, CP Backfill Tampers soon earn their cost by saving the time and labor of handling surplus excavated material.



For whatever type of work a contractor needs pneumatic tools, he will find CP equipment designed to handle the specific job most efficiently and economically. Besides the four typical CP products illustrated, other CP tools in wide use in contracting work include wagon drills, demolition tools, clay diggers, sheeting drivers, concrete vibrators, sump pumps and sludge pumps. Write for Catalog 600.



Ample Air — with Fuel Economy

In this portable compressor the gradual speed regulator and other CP features effect fuel savings of 15% to 35%. Varying the speed in proportion to air demand also reduces maintenance. CP gasoline-driven compressors range from 60 to 315 c.f.m.; Diesel-driven, from 105 to 500 c.f.m.

Popular CP Impact Wrench

With the CP 365-RP Impact Wrench, nuts and bolts, up to 1¼" bolt size, are applied or removed in a fraction of the time required by hand wrenches. Available either with side handle or pistol grip. One of a complete line of six models.

CHICAGO PNEUMATIC TOOL COMPANY
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PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
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Exclusive features, expert design and superior construction characterize Owen buckets. Long life with dependable service has resulted wherever Owens have been put to work.

The latest catalog is now available. You'll doubtless want to look it over, keeping your current excavating, material handling and dredging equipment demands in mind. Write for the catalog TODAY.

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DON'T SKIMP!

Maintenance Forces Repair Concrete Road

Replace Some Slabs Badly Cracked and Raise Others By Mud-Jacking With Loam-Cement-Water Slurry

✦ MAINTENANCE forces of the New Jersey State Highway Department effected some interesting repairs last summer to a 15-year-old concrete highway. Their work involved a distance of 3½ miles just east of Somerville on U. S. 22, or State Route 29. The pavement consists of three 10-foot lanes of 9-inch concrete reinforced with ⅜-inch deformed bars. It is flanked by 10-foot shoulders. The only joints are expansion joints placed at 35-foot intervals.

The pavement was built on native soil, a combination of red shale and clay, without any special sub-base foundation. It became subject to water seeping in from the sidehills and accumulating beneath the slabs. As a result, many sections of the concrete were badly cracked; joints were pumping water-suspended subgrade material; and a number of slabs, although still intact, had settled in varying degree.

To repair this important east-west highway, maintenance engineers decided to remove the slabs that had cracked and broken, and replace them with new concrete on a suitable sub-base. Other slabs were in good shape but had settled. These were elevated to proper grade by Mud-Jacking with a slurry composed of sandy loam, cement, and water.

In the center strip, not a slab was replaced and only about 15 needed to be jacked. Most of the work was done on the two outside lanes. There 50 slabs were replaced with 500 cubic yards of concrete. The total amount of Mud-Jacking covered 16,000 square yards of pavement, or about three-quarters of all the slabs on the two outside lanes. The repairs were completed between the latter part of July and the middle of October, 1946, with a crew averaging 20 men to cover all operations.

Removing Old Pavement

In removing the old pavement, cuts were made across the concrete by two of the crew. They used Ingersoll-Rand Jackhamers drilling holes 1¾ inches in diameter across the slab on 4-inch centers. They then switched their tools to paving breakers to cut out the concrete between the holes, thus effecting a complete cleavage. The pneumatic tools were powered by an Ingersoll-Rand 2-stage Model 160-A air-cooled compressor; a similar unit was held in reserve. A Universal crane with a 24-foot boom mounted on a Mack truck then went over the area to be removed. It dropped a 1-ton ball, 20 feet each drop, until the concrete was thoroughly cracked.

An Owen ½-yard clamshell bucket was next attached to the crane boom to dig up the broken rubble. As the bucket picked up the chunks of concrete, a man with bolt cutters nipped off the ⅜-inch rods of the steel-mesh reinforcing. The crane excavated 2 to 3 inches below the bottom of the pavement over the entire area, and to a greater depth where the wet condition

(*Continued on next page*)

C. & E. M. Photo

A dry mix of sandy loam and cement is shoveled from the truck at the right into the Koehring Mud-Jack hopper; water is supplied from the 1,000-gallon tank mounted on the Mack truck. A worker plugs up a hole to keep the slurry from exuding.

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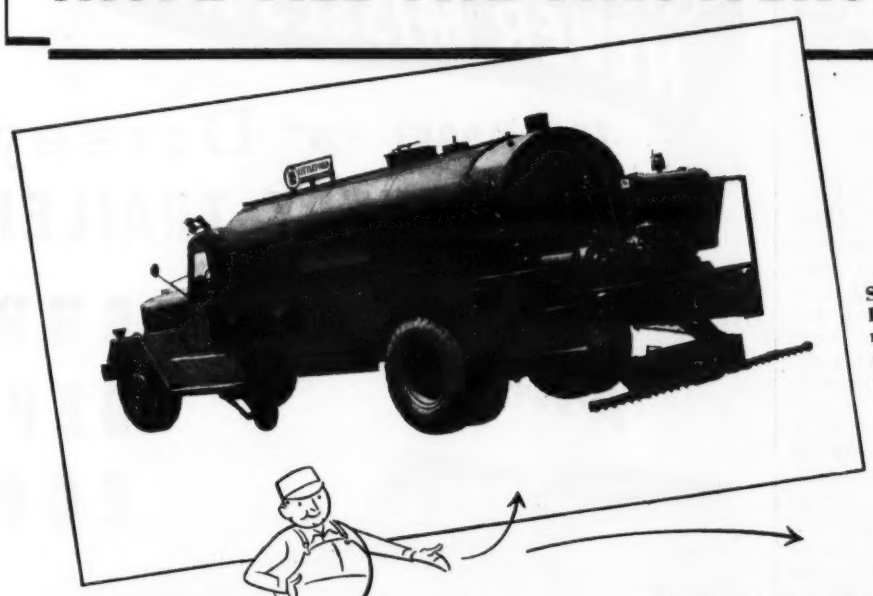
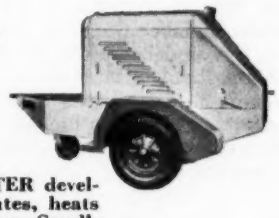
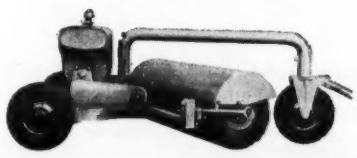


SPRAY MASTER Pressure Distributor applies asphalt, road oils, emulsion with bar up to 24 feet wide. One valve operates entire spray.



TANKAR STEAM HEATER develops steam in two minutes, heats tank cars in ⅓ less time. Small, compact, completely automatic, easy to trail.

LITTLE JOE KNOWS LITTLEFORD



No. 108 POWER DRIVEN BROOM sweeps in either direction, only two minutes to change. Hydraulic lift regulates brush tension. Many other features.

SUPPLY TANKS, semi-trailer or truck types; standard frame, or famous frameless construction. Sizes from 1250 to 4000 gallons.

Little Joe listens in on the "power politics" of Littleford equipment and reports as follows: Whatever your job of black top construction or maintenance, these Littleford units will handle it swiftly, efficiently, economically. Littleford long has made black top road work the object of its engineering skill and equipment-building facilities. Littleford equipment has many exclusive features and operating advantages, some of which are listed above. And there are alternate units, too, which may also interest you. Get the complete story by writing us today. Speed up and improve your black top work!

LB LITTLEFORD
BLACK TOP ROAD MAINTENANCE EQUIPMENT · SINCE · 1900

LITTLEFORD BROS., Inc.
485 E. PEARL ST., CINCINNATI 2, OHIO

C. & E. M. Photo
New Jersey maintenance forces use Ingersoll-Rand pavement breakers to square off the edges of old concrete prior to patching. In back, at right, is the I-R compressor which powered the breakers, and, at left, the reserve compressor.

Maintenance Forces Repair Concrete Road

(Continued from preceding page)

of the subgrade warranted; thus all soft spots were removed before placing the new concrete.

The material was hauled away in a fleet of five Mack 3 to 5-yard trucks and used to fill in washouts or widen fills within a 5-mile radius. If no locations within that area were in need of this rubble, it was stockpiled for use later on.

Placing New Concrete

The subgrade was leveled by a Caterpillar R2 tractor. Afterwards sand was added as sub-base material to bring the excavation to grade for the concrete. The sand was dampened, compacted into place by Ingersoll-Rand 6-inch mechanical tampers, and then rolled with a hand roller. Blaw-Knox road forms, of which there were 400 feet on the job, were set in place to receive the new 9-inch layer of concrete. This was purchased from the J. Loizaux Lumber Co. of Bernardsville, N. J. It was delivered to the job after a 12-mile haul in three to four truck-mixers of 5-yard capacity. The batches were mixed from 4 to 6 minutes per 5 cubic yards after the truck-mixers had reached the site.

Water for wetting the subgrade in advance of the paving came from a 500-gallon tank mounted on a Chevrolet truck, which was equipped with a Goulds 2-inch pump. The latter was for pumping water from creeks if necessary. But on this particular project the water was purchased from the Somerville Water Co. and taken from the hydrants which were within easy reach. The same rig was used to keep the burlap wet when the concrete was being cured for a 5-day period.

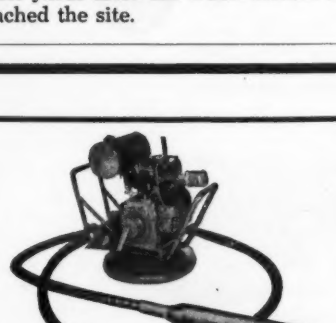
The theoretical mix of the concrete was 1 : 1.67 : 3.5 for a 7-bag batch. But in order to get a denser concrete for a quicker set, 2 extra bags of cement were added to each batch. The dry weights of a typical batch, to which 4 gallons of water were added for each bag of cement, were as follows:

Cement	846 lbs.
Sand	1,155 lbs.
Stone, ¾-inch	1,006 lbs.
Stone, 1½-inch	1,510 lbs.
	4,517 lbs.

Where a fresh pour adjoined the original concrete not at a joint, the old pavement was undercut 9 inches back and to a depth of 6 inches beneath the bottom of the concrete. This 6-inch cut was extended for 9 inches beyond the edge of the concrete across the width of the lane. The shallow trench, 10 feet long x 18 inches wide x 6 inches deep,

(Continued on next page)

C. & E. M. Photo
A Universal truck crane with a 24-foot boom and an Owen ½-yard clamshell loads a Mack 3-yard truck with rubble.



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THE MODEL "M" Dorsey MACHINERY TRAILER
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The rugged Dorsey Model "M" Machinery Trailer does big jobs in a big way! No breakdowns!—no delays!— skilled Dorsey engineering specifies only high-quality materials and master craftsmanship . . . resulting in 3 outstanding features that make Model "M" operation—

Dependable! — the Model "M" is always on the job . . . a gold-star workman putting in a full day's work *every day* for your greater profit!

Durable!— the Model "M" takes any hauling job in smooth, easy stride . . . from 15 to 25 tons!

Economical! — the Model "M" combines *Durability* and *Dependability* to give fast, low-maintenance heavy machinery transportation—any and *every* time you want it!

Ruggedly built for steady service . . . promising a long, uninterrupted work-life . . . The Dorsey Model "M" Machinery Trailer boasts—

Positive Action Brakes to assure Passenger Car control—and safety!

Patented Tubular Trunnion-type Axles to absorb road shocks and ease wear and tear on the trailer!

A Frame Sturdily Constructed to give you year after year of *trouble-free* service!

Write TODAY for Dorsey Bulletin 8210!

15 TON
20 TON • 25 TON

In the Model "M" group of 15-ton, 20-ton and 25-ton capacities, there is a Dorsey hauling unit well adapted to your requirements. So, to lighten your heavy hauling problem, check *today* with your nearest Dorsey dealer or distributor. *Save*—by studying the *Modern Designed Transportation* advantages *built into* the Dorsey Model "M" Machinery Trailers!

DORSEY
DORSEY TRAILERS
ELBA, ALABAMA, U.S.A.

Maintenance Forces Repair Concrete Road

(*Continued from preceding page*)

was filled with concrete to form a sill or footing for the new junction. The reinforcing steel in the old concrete, which had been exposed, was left projecting 18 inches to bond the new pour to the old. This sill was hand-floated with a steel trowel. After it had hardened it was covered with tar paper before the pavement slab was poured on top.

At an expansion joint the same kind of sill was constructed, and likewise covered with tar paper. Between the slabs a premolded tar-impregnated paper joint was used, supplied in one strip 10 feet long x 9 inches deep x ½ inch thick. Through this joint were six equally spaced round steel dowels, 20 inches long x ¾ inch in diameter. They were oiled on both ends but had one side wrapped in paper. The dowels were supported in position by ⅜-inch steel rods bent into an arc and driven in the ground. Longitudinal joints of the same material were placed against the original concrete and held there with other ⅜-inch rods in the same manner, with one rod about every 4 feet.

The truck-mixers chuted the concrete into the forms to within about 2 inches of the top. This level was then more clearly defined with a steel screed; it was indented 2 inches so as to leave room for the steel-mat reinforcing. This was made up of ⅜-inch steel rods spaced 7½ inches transversely and 27 inches longitudinally. Further reinforcing was added in the form of marginal bars, ¾ inch round and 10 feet long, placed on top of the mat at each joint and 6 inches in from each side. Concrete was then added, covering the steel. It was leveled off with a wooden screed even with the top of the forms.

A final leveling and smoothing was done with another steel screed. The three screeds were handled by six men and were followed by two finishers with 10-foot straight-edges. If the concrete appeared too wet, a burlap drag was pulled over it. This was followed by brooming and edging at the sides and joints with a ¼-inch-radius tool. When the truck-mixed concrete was available in steady quantities, the maintenance crew placed 140 linear feet of 10-foot-wide pavement in 6 hours. After the concrete had set and cured, the paper joints were peeled off at the top with a shovel and the groove between the slabs was poured with tar.

Shallow Patching

In a few sections of pavement where the surface was only slightly cracked to a very shallow depth, patching of the concrete sufficed. The pneumatic hammers removed the concrete down to the mesh reinforcing. This was then coated with a cement and water paint applied with a brush. The paint was made by mixing a shovelful of cement with 2 quarts of water. Next, fresh concrete was placed on top of the reinforcing and screeded in the same way as was the full-depth slab.

Mud-Jacking

Where the concrete slabs were in good condition as regards cracking and scaling but had settled unevenly, they were brought back to grade by Mud-Jacking. If only one end of the slab was low, two holes were drilled through the concrete, one on each side, 30 inches from the joint and the same distance in from the edge. If the entire 35-foot slab had to be raised, ten holes were required; there were five to a side about 30 inches from the edge of the concrete, and they were staggered so that they would not be opposite each other.

The jackhammers drilled these holes 2⅝ inches in diameter. Into them was then inserted a ½-inch pipe with a barb on the lower end projecting an inch. This pipe was 18 inches long and connected to the air compressor. By blowing air through the pipe and moving it around at the same time, the pocket below the slab was enlarged by the projection and was cleaned out by the compressed air. It has been found that, by forming these pockets first, the hydrostatic pressure is more evenly exerted with the slurry.

The sandy loam and cement for the slurry were mixed in a Koehring 2-bag concrete mixer. This was set up on a platform 8 feet high so that the material could be easily dumped into trucks for

(*Concluded on next page*)

PMCO
America's Most Complete Line of Material Handling Buckets
All purpose
• SHOVEL
• PULLSHOVEL
• DRAGLINE
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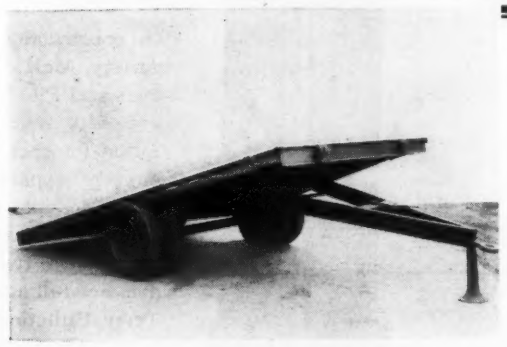
• FRONTS, BOTTOMS, SCOOPS AND TEETH are 14% manganese steel developing tensile strength up to 120,000 p.s.i. This high percentage manganese steel gives tough, rugged strength for hard service and allows wide set corner teeth for easy entrance in digging. Volume production methods enable us to build a better bucket with amazing economies in manufacturing.
On the ½ yd. and ¾ yd. Shovel and Pullshovel Buckets, all teeth are interchangeable — a great advantage to operators.
Experience Counts
See your shovel man or equipment dealer about PMCO Buckets and Dippers.
Clamshell
Sizes ⅜, ½, ¾, 1, 1½, 2 yds.
Pullshovel
Outside Cutter Widths: 26"—31"—36"—39"
Dragline
All Purpose Sizes ⅜ to 2 yds.
Stripping sizes 2 to 9 yds.
Shovel
Sizes ⅜ to 18 yds.
"Quality Since 1880"
PETTIBONE MULLIKEN CORP. CHICAGO 51, U. S. A.
WE OPERATE THE LARGEST AND MOST COMPLETE MANGANESE STEEL FOUNDRY IN THE UNITED STATES.


Tilt Top Trailer
One Man Loading
Two Sizes—5 and 8 Ton Capacity
Exceptional Ease of Loading—Dependable and Fast
IMMEDIATE DELIVERY
Milwaukee Power Equipment Co.
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Milwaukee, Wisconsin
Phone: West 1380

Maintenance Forces Repair Concrete Road

(*Continued from preceding page*)

hauling it to the Koehring Mud-Jack where water was added. For each cubic yard of sandy loam, 8 bags of cement were used. To this was added about 125 gallons of water to form a slurry of the right consistency. Each 2-bag dry batch was mixed for about one minute. Soil for Mud-Jacking was purchased from a commercial pit at Milltown, 15 miles away, where it was loaded into the state trucks for hauling to the mixer. Nazareth bag cement was delivered to the job by a dealer at Raritan only 3 miles away.

The dry mixture was hauled in trucks to the Mud-Jack. There it was shoveled into the hopper as water was added from a 1,000-gallon tank mounted on a Mack truck. The slurry was pumped through a 2½-inch hose 20 feet long which was easily rolled about on the pavement on two 4-roller buggies. At the end of the connection was an 8-inch-long nozzle. It had a 2-inch diameter, but it was of flexible material. So after it was inserted in the drilled hole, it expanded with the slurry passing through, and made a tight fit so that no slurry could ooze out around the sides.

Jacking was done from the lowest point, and on this job some slabs were raised as much as 4 inches. At other locations the same crew has jacked pavements as much as 1 to 1½ feet. The jacking is done gradually by shifting the hose from hole to hole and inserting wooden plugs to keep the slurry from exuding.

After the concreting and jacking operations were completed, the 10-foot shoulders were shaped to grade either by the power graders or a Caterpillar R2 tractor equipped with a 6½-foot dozer blade.

Personnel

The highway repairs at Somerville were under the supervision of Joseph Henry, Maintenance Foreman. The New Jersey Highway Department is headed by Spencer Miller, Jr., Commissioner, with Alex W. Muir, Superintendent of Maintenanee; Kenneth B. Craft, Material Supervisor; and Michael A. Lanzara, Field Supervisor.

Protect your future by investing regularly in U.S. Savings Bonds.

Link-Belt in Milwaukee

The opening of a new sales office has been announced by the Link-Belt Co. of Chicago. The new office, located in the Century Bldg., 808 No. Third St., Milwaukee 3, Wis., will be under the direction of W. M. Hufnagel, District Sales Manager. He will be assisted by H. B. Johnson and F. E. Sweeney.

HUMDINGER

WRITE FOR NEW CATALOG No. 4503

SELF PRIMING CENTRIFUGAL PUMPS

Always dependable

Ruggedly built for heavy duty service

SIZES 1½" TO 10"

RALPH B. CARTER COMPANY HACKENSACK, NEW JERSEY

FASTER LOADING, LIFTING, SCRAPING

The Ottawa INDUSTRIAL HYDRAULIC FRONT END LOADER

"The Ottawa" INDUSTRIAL Hydraulic Front-End Loader saves hundreds of man hours on every job. A rugged heavy duty attachment for industrial type tractors that loads bulk materials, does light bulldozing jobs and operates as a portable crane. A year round labor saver—will do hundreds of odd jobs better faster. Bulldozer, Boom and Snow Plow attachments available to give you maximum productive use of your industrial tractor.

Fits most models of industrial tractors. Write today for prices and illustrated bulletin. IMMEDIATE SHIPMENT.

OTTAWA STEEL PRODUCTS, INC.
OTTAWA, KANSAS

Center Strip FOR LONGITUDINAL & TRANSVERSE Keyed Joints "TONGUE and GROOVE"

. . . to millions of feet of job-tested installations throughout the United States. KEYSTONE Asphalt Mastic Board Center Strip provides the Tongue and Groove "keyed action" that engineering authorities demand for today's smooth, safe paving jobs.

The principle of expansion and contraction joints designed to absorb the shrinkage and creeping of concrete under varied weather conditions has been universally accepted. In common use, tongue and groove joints (with or without dowel bars)—because of their "keyed joint" action—have proved an efficiency vastly superior to all existing types. Through this "keyed joint" action, maximum load transmission is assured when pre-formed KEYSTONE center strip is used both longitudinally and at 15 foot spacings transversally. Rigid, waterproof, easy to handle

Ask about the NEW KEYSTONE EQUIPMENT LINE

KEYSTONE offers contractors a joint slitting machine, concrete curing compound spray machines and rubber asphalt joint sealing compound kettles at accepted manufacturer's prices directly from KEYSTONE Products Company. Write or wire.

KAP

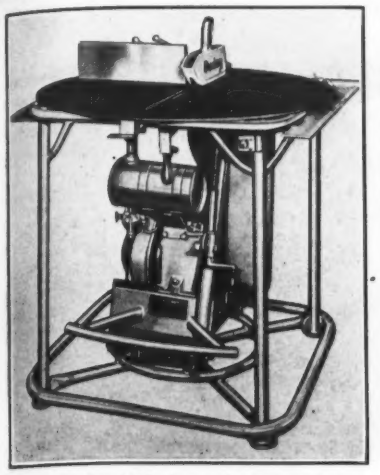
KEYSTONE ASPHALT PRODUCTS COMPANY
A Division of the American-Marietta Company
43 E. OHIO STREET, CHICAGO 11, ILLINOIS

McKiernan-Terry

PILE HAMMERS and EXTRACTORS

On construction projects of unlimited variety, McKiernan-Terry Pile Hammers and Pile Extractors have for the past fifty years been building a world-wide reputation for speed, power, safety and dependability. Greatly expanded manufacturing facilities now make possible prompt deliveries of double-acting hammers in ten standard sizes; double-acting extractors in two sizes; single-acting hammers in five. For full information, write for free McKiernan-Terry Bulletins No. 55 and No. 57. MK-1008

McKIERNAN-TERRY CORPORATION
Manufacturing Engineers
19 Park Row New York 7, N. Y.



The circular table top and saw mechanism of this Nordberg-Buday unit rotate together to permit changes of cutting angle, without power shut-off.

New Circular Saw Features Rotating Top

A saw with a circular rotating top known as the Nordberg-Buday saw is the newest addition to the line of equipment made by the Nordberg Mfg. Co., Chicago and Oklahoma Aves., Milwaukee 7, Wis. This saw was developed primarily for use where frequent changes in cutting angles are required.

An outstanding feature is the rotating table; the circular table top and saw mechanism rotate as a unit. When the cutting angle is changed from ripping to crosscutting or to mitering, it is necessary only to rotate the table to the desired angle and make the cut, the manufacturer points out. This can be done without shutting off the power.

When equipped with a 12-inch blade, the saw will crosscut to a width of 16 inches or rip to a depth of 4 inches. It is powered by either a 3-hp gasoline engine or a 1½-hp electric motor. As standard equipment, the saw is supplied with two steel work tables 10 feet in length and fitted with ball-bearing steel rollers. A foot lever helps move the saw through lumber when the operator is making heavy crosscuts.

The splitter, saw guard, and operating handle are combined in a single unit. The saw arbor runs on sealed ball bearings. The saw is light in weight and can be lifted and moved by two men, the manufacturer says. The table top is marked in degrees and in carpenters' standard pitch markings. The table can be rotated from 90 degrees in one direction to 65 degrees in the other.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 24.

Vibrators for Concrete

The line of gasoline concrete vibrators which is made by the Baily Vibrator Division of Stow Mfg. Co., Binghamton, N. Y., is described in a catalog now being distributed by the company.

The Model H has a 3-hp 4-cycle air-cooled motor; it produces 6,000 to 7,200 vibrations per minute. It features a circular carrying ring which also protects the machine in case it is knocked over or bumped into. Model HW is similar to Model H, except that it has a rubber-tired wheelbarrow mounting. Both models are recommended for highways, airports, walls, piles, etc. By adding a Stow flexible workshaft, the vibrators are converted into portable gasoline-driven flexible-shaft machines.

The smaller models in the line are the J6 and J4, each having a 1½-hp 4-cycle motor. The J6 produces 6,200 to 9,000 vpm, and the J4, 4,000 vpm. Both machines are adaptable to general construction work. The J6 is well suited for narrow forms and roadway joints, etc.

The vibrator heads feature a wear-resisting case, oversize ball bearings, special Bakelite ball carriers, and lifetime lubrication.

The catalog also describes the special Stow equipment for concrete grinding and surfacing, and the accessories for the vibrators. The final page is devoted to a discussion of the reasons for, benefits of, and the effects of vibration.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 86.

Hole-Digger Distributor

The appointment of a distributor to handle its hole digger on a nationwide basis has been announced by the Hugh B. Williams Mfg. Co., Dallas, Texas. The Joslyn Companies, who will handle the digger, also carry complete poleline equipment and accessories. Joslyn offices and representatives are located in principal cities.

The Williams hole digger is designed for digging inclined or vertical holes up to 20 feet deep and from 8 to 36 inches in diameter. Its bit is said to be self-cleaning in sticky clays through suddenly accelerated rotation.

Where roads look better, are safer and cost less to maintain—look for
TUTHILL GUARDS
TUTHILL Guard makes roads safer, look better and cost less to maintain. Strong steel, convex panels are cut to convenient lengths for quick, easy, economical installation. Rounded end pieces finish the job—make it look neat, attractive. Built for visibility . . . safety . . . economy . . . TUTHILL gives it! Available for complete installation. Request details.
Pacific Coast Manufacturers and Distributors: U. S. SPRING & BUMPER CO., Los Angeles, Calif.
TUTHILL SPRING COMPANY
762 W. POLK ST. CHICAGO 7, ILL.

Fleet after fleet is piling up mile on mile of low-cost operation with

Stanolube HD

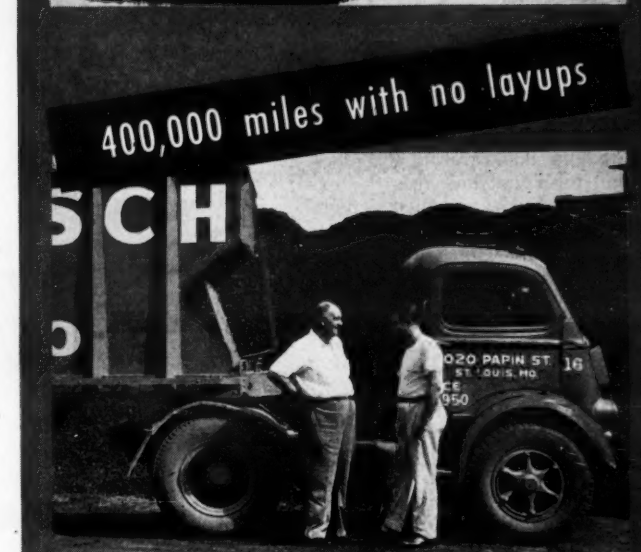
LOOK at some of the records. The 1942 GMC truck-tractor (top, right) was put into operation on Stanolube HD early in 1943 by Bringwald's Transfer, Vincennes, Indiana. Now after 118,000 miles on the original rings the engine still has good compression pressures.

Or take the 25-ton coal truck operated by Wm. Klipsch and Sons Coal Company, St. Louis, Missouri. In well over 400,000 miles of steady, daily driving there has been no time lost due to faulty engine performance.

The Heiss Baking Company fleet at Oshkosh, Wisconsin, (below) was plagued by sludge and varnish trouble until Stanolube HD was recommended by a Standard Oil Automotive Engineer. He reports that repairs were reduced, clogging of oil screens disappeared, and engines stayed clean with positively no ring sticking.

These are not the unusual records—they're typical of fleet performance on Stanolube HD.

You can find out how much this modern heavy-duty motor oil will cut maintenance simply by asking a Standard Oil Automotive Engineer to test it in one of your hard-working trucks. This Engineer also has a Streamlined PM plan to help you get maximum life and power from all units in your fleet. Write Standard Oil Company (Indiana), 910 South Michigan Ave., Chicago 80, Ill., for the Engineer nearest you.



STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

Rock Plant Produces Airport Base Course

(*Continued from page 2*)

CAA terminal. The rock face there is about 24 feet high, and is a part of the ancient Niagara lime formation.

Two drillers were used working full time with an Ingersoll-Rand FM-2 wagon drill and a Chicago Pneumatic Model 70 drill. Detachable bits were used on steel 20 feet long. Holes were drilled horizontally from the floor of the quarry, and one bit would last just long enough to drill a hole. The drillers then discarded the worn bit rather than take the time to sharpen it.

Holes were loaded with 40 per cent du Pont gelatin and shot with a blasting machine. It was routine to have two drillers and one man loading constantly while the rock plant was operating. Holes were loaded out to within 8 feet of the surface with gelatin, with no capping necessary.

Crushing and Hauling

As soon as the rock was shot, it was loaded directly into the primary jaw crusher, set at 3½-inch clearance, by a Northwest 1½-cubic-yard shovel. This shovel could always work at least half a shift before running into the limit of its reach to the crusher hopper. Very often on a heavy ledge the rock supply lasted all day. In any case, it took only ten minutes to start up the truck, pull the crusher out and over, and back it in again to the rock face. This move was usually made during the noon lunch hour or at the end of a day's shift.

Crushed rock was taken off the end of a 30-inch rubber conveyor belt by a fleet of seven International and GMC 5-yard dump trucks. Hauled to the runways, it was dumped and spread. The 7-inch sub-base course was laid in two layers and rolled by S. J. Groves & Sons equipment to 95 per cent modified Proctor density.

All power for the new crusher comes from a Murphy Model ME-66 diesel engine. Output from the crusher was remarkably steady, and even in a small quarry it was possible to dig a ribbon of rock from a well defined face, leaving a "squared-up" look around the place. According to Wonn, he saves the expense of three trucks and their drivers, which ordinarily would be required to haul the rock from the shovel to the primary crusher.

This part of the work, which was supervised by Wonn himself, was finished by November 1, 1946.

Low-Bed Trailers From 7 to 30 Tons

A series of low-bed trailers for moving construction equipment is manufactured by the Martin Machine Co., Kewanee, Ill. They are available in various sizes to transport a wide variety of equipment. Capacities of standard trailers range from 7 to 30 tons, with trailers up to 80 tons built to special order to meet the requirements of customer specifications.

The Carryhaul Models 7, 10, and 15 are low-platform trailers built for front and side loading. These models are available in either 2 or 4-wheel types. The 2-wheel models are supplied with a truck-hitch fitting for connection to a heavy-duty truck.

The Model 4 front-loading trailer is designed to haul the Caterpillar D4 wide-gage tractor. It carries its load closer to the ground to provide maximum overhead clearance for wires, trees, viaducts, etc. It is also available for the narrow-gage D4 tractor. On special order, trailers of this design are made for other sizes of Caterpillar tractors. For the D2, Model 2 Carryhaul Chariot is available and will carry from 4 to 6 tons, depending upon tire sizes and the speed desired.

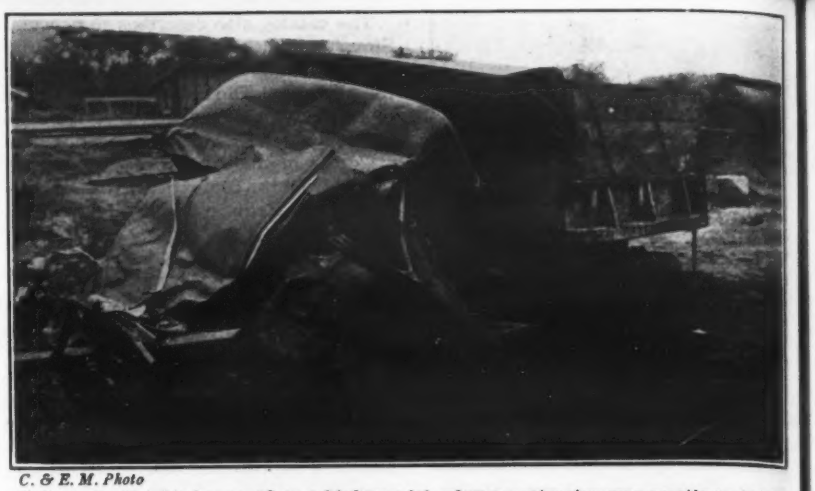
Also made by the Martin Machine Co. are arched-front and semi-trailers. These can be had with tandem rear axles. Semi-trailers can be ordered with or without removable goosenecks to accommodate front loading.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 25.

Landis to Great Lakes

The appointment of Reed G. Landis as Vice President in Charge of Sales has been announced by the Great Lakes Supply Corp., of Chicago, Ill.

Colonel Landis is a veteran of both World Wars; he also served with the U. S. Army in the Mexican Border service. Before World War II, Mr. Landis was a Regional Vice President of American Airlines. Previous to that, he had his own sales and advertising agency and participated in developing merchandising programs for manufacturers' and distributors' associations in the nation's mill-supply business.

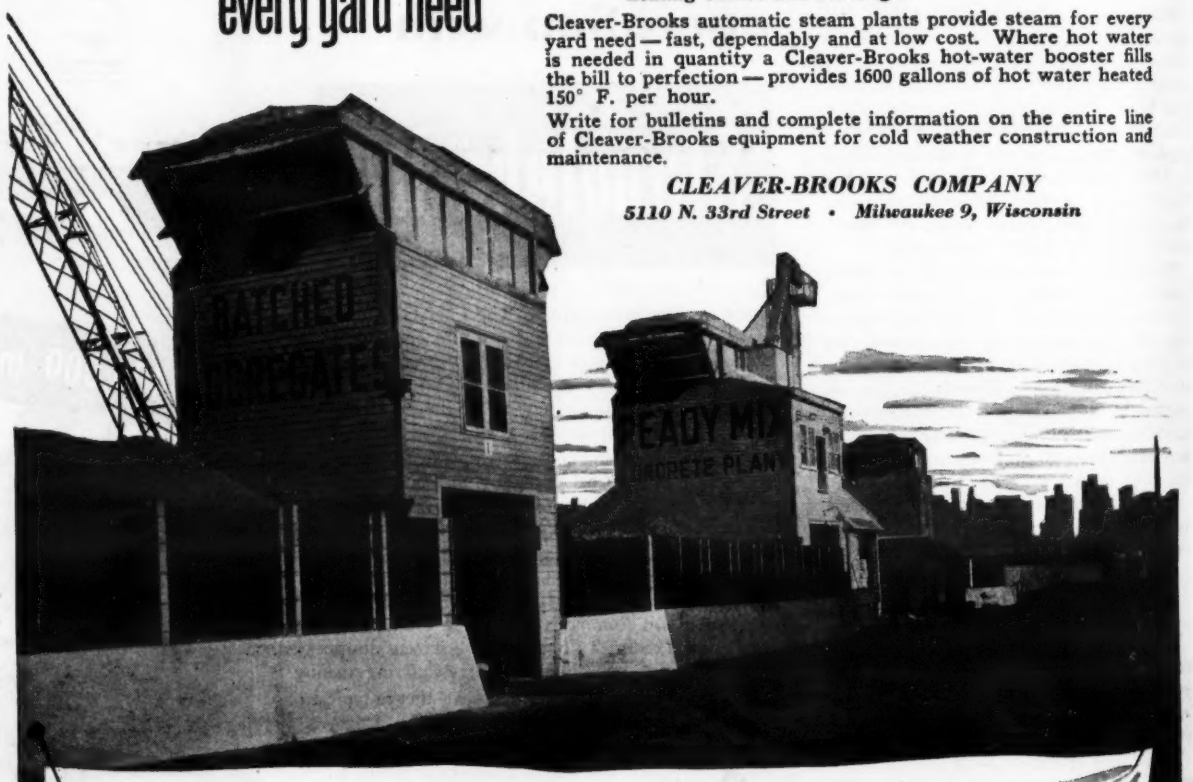


C. & E. M. Photo

Safety—last! This happened on a highway job when a contractor was erecting a batch plant. The truck was allowed to sit under a heavy swinging over-load. The cable sling parted. Result: a smashed truck, expensive repair, and higher insurance rates. Fortunately the driver jumped in time. Moral: don't put 'em in places like that.

Steam Hot Water or Heat

-- at Low Cost for every yard need



● Profitable, uninterrupted yard operation in cold weather calls for steam — hot water or heat — for many purposes.

- thawing and heating aggregate in stock piles or bins — for winter concreting.
- heating water for central mixing plants.
- heating asphalt, oils, bituminous material in tank cars or storage tanks.
- steam or hot water for cleaning machinery — heating offices and buildings.

Cleaver-Brooks automatic steam plants provide steam for every yard need — fast, dependably and at low cost. Where hot water is needed in quantity a Cleaver-Brooks hot-water booster fills the bill to perfection — provides 1600 gallons of hot water heated 150° F. per hour.

Write for bulletins and complete information on the entire line of Cleaver-Brooks equipment for cold weather construction and maintenance.

CLEAVER-BROOKS COMPANY
5110 N. 33rd Street • Milwaukee 9, Wisconsin

Automatic Steam Plants
Completely self contained; highly efficient; require only simple piping connections to place in operation. Fully automatic fuel-oil burner; condensate recovery and feed water pumping system; no stack needed, sizes from 20 to 500 h.p.; pressures 15 to 200 lbs.

Hot Water Boosters
Oil-fired; fully automatic or manual operation; no licensed engineer needed; two capacity sizes: 3000 gals. storage tank for 1600 gals. of water heated 150° F. per hour; 1500 gals. storage tank for 800 gals. of water heated 150° F. per hour.

Portable Pumping Boosters
Heats bituminous material by direct firing in one operation, loading directly to distributor, relay truck or returning to tank car. Two sizes, truck mounting or 4-wheel trailer.

Portable Tank-Car Heaters
Available in 2 and 3 tank-car sizes. Oil-fired with exclusive four-pass flue travel; dry-coil steam condensate return under pressure — no water or heat loss. Provides a portable source of steam wherever needed.

Cleaver-Brooks

Pioneers and Originators of ★TANK CAR HEATERS ★BITUMINOUS BOOSTERS ★AUTOMATIC STEAM-PLANTS

Blast New Highway Through Mountains

Grading, Crushed Base Course, and Road-Mixed Armor Coat Modernize U.S. 16 Through Big Horns

♦ A FEW miles west of Buffalo, Wyo., sharp peaks of the Big Horn Mountains reach through cloud banks 8,000 feet high. Those mountains have recently been conquered by 8½ miles of new first-gear high-speed modern highway, replacing a narrow, winding portion of U. S. 16 built in 1928. The new road was blasted through rock, hewn in conglomerate formations on precipitous mountain slopes, and finally topped with a 24-foot riding surface of road-mixed asphalt armor coat on a select crusher-run base.

The job was done in two sections by two contractors. The east part, 4.93 miles in length, was let by the Wyoming State Highway Department to Big Horn Construction Co. of Sheridan, Wyo. The west portion, far up on the Big Horn slopes, totaled 3.91 miles. It was let to Peter Kiewit Sons Co. of Omaha, Nebr. Altogether the two jobs called for the expenditure of $500,000. Big Horn Construction Co.'s contract, which included the heavy grading, amounted to $348,500.

Design of the new road embodies such features as variable slopes which reach out to the right-of-way limit lines. It includes a 7 per cent grade up the mountainsides, and two 12-foot traffic lanes with 3-foot shoulders fairing out to the roadside drain ditches. It calls for 1½ inches of asphaltic armor coat to rest on from 4 to 8 inches of crushed rock.

The finished highway has the appearance of being extremely wide and safe, despite its skirting of deep canyons and its passing high up above the Big Horn timber line, where early autumn snow squalls make deer and elk hunt cover in evergreen thickets.

The Big Horn Construction Co. is a subsidiary of the far-flung Peter Kiewit organization. Both jobs were done by Peter Kiewit equipment and supervision from the Sheridan headquarters. For that reason we shall treat the two sections separately only insofar as construction designs differed.

Grading

Almost all the 429,000 cubic yards of common and rock excavation was located on the Big Horn Construction Co. contract. Only 20 per cent was dirt. At least 70 per cent was a conglomerate formation with boulders. Perhaps 10 per cent was solid rock, in heavy porphyritic granite.

The right-of-way was cleared by a Caterpillar D8 and LeTourneau bulldozer and a 6-man labor crew armed with axes. Scrub pine growth was removed and burned. This same bulldozer was also used to pioneer a few of

(*Continued on next page*)

Photo courtesy of A. G. Ruppert

High up over old U.S. 16 a Caterpillar-mounted bulldozer pioneers a new highway through the Big Horn Mountains in Wyoming. Some of the cuts were 100 feet deep on this job which replaced a section of narrow winding road with a modern highway.

Portable

Heater Sale—50% off

HERMAN NELSON powerful 250,000 BTU Portable Heaters (gasoline-burning) complete with blower, air-cooled engine, collapsible ducts, portable mounting. No smoke; no soot; no open fire. Self-powered, self-contained. Cuts Winter's delays; improves efficiency.

HEATING buildings, shops, sheds, warehouses, buildings under construction, etc.

PRE-HEATING engines on trucks, tractors, aircraft, machinery, etc.

DRYING concrete, plaster, paint, mortar, lumber, other materials.

SPOT-HEATING men, materials, machinery, equipment, storage tanks, etc.

THAWING frozen areas, box cars, equipment, etc.

VENTILATING and heating manholes, tunnels, box cars, ships' holds, etc.

ORIGINAL COST Over $660.00
with portable mounting

SALE PRICE $330.00

Freight prepaid in U. S. A.

All units completely rebuilt and positively guaranteed.

SEND FOR LITERATURE

BERNSTEIN BROTHERS
Since 1890
PUEBLO Dept. D-1 COLORADO

Building 4-Lane Highway in the Poconos

Looking north toward Mt. Pocono. Scraper (foreground) smooths road bed. Bethlehem hinged bar mats and road joints are being used in paving operations (background).

Bethlehem reinforcing bars help provide strength for this 166 ft culvert, located near southern end of new road.

C. W. Good, general contractor appears at the left. At the center is M. E. Boogar, district construction engineer, and at the right C. M. Benz, resident engineer, both of the Pennsylvania Department of Highways.

These on-the-job photographs were taken during construction of a 4-lane highway in the Poconos, between Tannersville and Mt. Pocono, Pa. Built to replace a winding, outmoded road, this 5.7-mile stretch of highway is part of U. S. 611—express route from Philadelphia to Scranton and the north.

In addition to more than 139,000 sq yd of pavement, the job includes three bridges, three culverts, one arch, and one arch-extension—all of reinforced-concrete construction. C. W. Good, of Lancaster, Pa., is the general contractor.

Hinged bar mats, bridge reinforcing, road joints, guard rail and posts were supplied by Bethlehem.

An example of Bethlehem's dependable steel service to contractors . . . Bethlehem hinged bar mats arrive at the job, ready for use.

Below: Bethlehem hinged bar mat goes into place over a 7-in. concrete fill. Note ease with which bar mat is handled by two men.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

STEEL FOR HIGHWAYS

Road Joints Reinforcing Bars Bar Mats Guard Rail Guard Rail Posts and Fittings Wire Rope and Strand Hollow Drill Steel Fabricated Structural Steel Sheet and H-Piling Spikes Timber Bridge Hardware Bolts and Nuts Tie-Rods

BETHLEHEM STEEL

New Road Blasted

(*Continued from preceding page*)

the heaviest cuts, some of which were 100 feet deep. Clearing began on December 10, 1945, in the face of winter, with a time stipulation of 180 weather working days in the contract.

Late in December two Caterpillar D8's and a LeTourneau Rooter appeared on a Kiewit trailer to dig out for a box culvert at Station 374+10. This equipment then moved up on top of deep cuts, where material could be pushed off the edge. Where dirt and boulders could be ripped loose and tumbled off the side without having to be moved more than 200 feet, D8-mounted bulldozers did a major share of the work. Three such machines were used through December. Progress reports showed that they accounted for 500 cubic yards of excavation per 8-hour shift, day after day, when they were working in boulders.

A Northwest 80-D 2½-yard shovel came down from Sheridan when several cuts were pioneered to a safe footing by bulldozers. The shovel was set up to dig and cast material off the steep mountain slopes. It accounted for 120 cubic yards per hour. This work was limited, and as soon as it was finished the shovel began to load three Euclids. It accounted for 144 loads totaling 1,008 cubic yards on one peak 8-hour shift, but it never fell very much underneath that figure. The Euclids were double-spotted as much as possible to boost shovel output.

Some of the job was tractor-equipment work, particularly on those top sections where topsoil and loose conglomerate were found. Three LeTourneau Model FP Carryalls and two LeTourneau LP's were brought in, each with a Caterpillar D8 tractor for power. Tractor-powered Carryalls turned in some of the best yardage of the job, especially where they were preceded by the double-toothed Rooter. Five of these large scrapers, loading downhill and dumping at the foot of their travel cycle less than 500 feet away, accounted for an average of 2,700 cubic yards per 8-hour shift.

A great deal of the dumped excavation was uncompacted. Where fills were made, the earth was placed in 8-inch lifts and packed by two sheepsfoot rollers. Wyoming State Highway Department specifications were written so the contractor was paid for water per 1,000-gallon units, and for sheepsfoot rolling by the hour. The resident engineer and his inspectors therefore controlled the amount of rolling and watering. Finished compaction results were aimed at 90 per cent of optimum density.

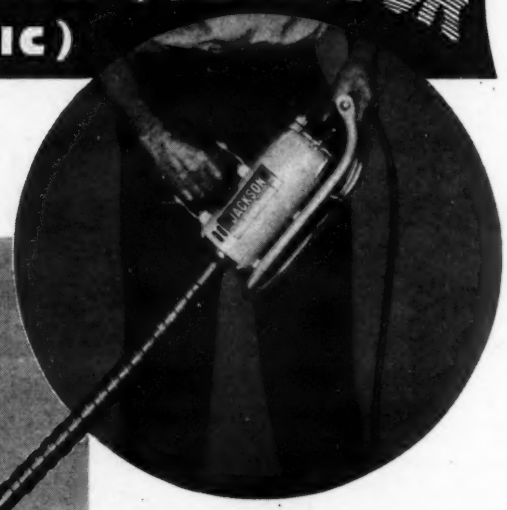
Heavy Rock Work

The most difficult obstacle to pushing a highway up through the Big Horns was a formation of ledge granite, which outcropped in the way of the road. High explosive, at a blasting ratio of a pound of powder per cubic yard, was the only solution. An Ingersoll-Rand 210-cfm air compressor and a Chicago Pneumatic machine of the same size were jerked in by tractors to power a Gardner-Denver wagon drill and four Ingersoll-Rand JB-55 Jackhamers.

Timken steel and detachable rock bits were used, with 12-foot steel the longest length. Drill bits 2½ inches in diameter were used on the wagon drills, and 1½-inch bits bored down through

(*Continued on next page*)

The JACKSON FS-7A
AN AMAZINGLY VERSATILE
CONCRETE VIBRATOR
(ELECTRIC)



Ideal for
THIN WALLS
•
HEAVY RE-INFORCED SECTIONS
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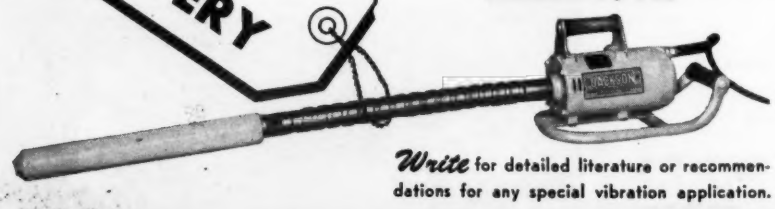
HARD TO-GET-AT PLACES
and
MANY JOBS
FORMERLY HANDLED ONLY BY LARGER VIBRATORS

NOW READY FOR DELIVERY

You're making no mistake when you put this vibrator at the top of your equipment requirements list; for with just the price of one machine invested, you're thoroughly equipped to handle a wide variety of jobs to best advantage. The motor weighs just 28 lbs., yet it will handle efficiently any of our standard heads up to 2⅜" x 18½", with flexible shafting of 24", 36", 7' or 14' lengths — delivering 7,000 to 10,000 vibrations per minute, depending on the length of shaft, size of head and consistency of concrete. Operates on AC or DC, 110-120 volt standard commercial power, single phase or Universal tools, and may be plugged into light socket or power plant. Vibrator head interchangeable with grinding attachment.

MODEL FS-7A



Write for detailed literature or recommendations for any special vibration application.

ELECTRIC TAMPER & EQUIPMENT CO. LUDINGTON MICHIGAN

Prevent
CONCRETE CRACK-UP!

Seal Your Expansion Joints With PARA-PLASTIC

The Positive and Permanent Top Seal All Year 'Round

PARA-PLASTIC is a hot-poured material that forms a rubbery, resilient, adhesive and cohesive plastic. PARA-PLASTIC is poured as a top seal in conjunction with the non-extruding premolded KORK-PAK fiber expansion joint filler. This combination is the positive and permanent method to secure a waterproof joint.

PARA-PLASTIC bonds firmly with concrete and maintains a perfect seal during sub-zero temperatures. PARA-PLASTIC is the positive and permanent seal all year 'round against the infiltration of water.

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THE WELLMAN ENGINEERING COMPANY
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New Road Blasted

(*Continued from preceding page*)

the dark granite on Jackhamer steel. As bits lost gage, they were used farther down in the holes.

Rock ledges were so spotty that no really comprehensive drilling pattern could be developed. Holes went down on 3-foot centers if the formation was solid and extensive, but centers were spread apart where the solid rock tapered off to conglomerate. The dark granite was solid and abrasive enough to dull a detachable rock bit in 3 feet of drilling. Drill bits were shipped to a shop in Billings, Mont., to be sharpened. They were re-used four or five times before they were discarded.

After the holes had been sprung with 60 per cent gelatin, du Pont 40 per cent bag powder was used. It was loaded and tamped, and a cap placed in each hole. Some of the average figures on blasting show that a powderman and a helper loaded up to 1,000 pounds of powder on peak days. The Gardner-Denver wagon drill accounted for approximately 175 feet of drilled hole in 20 hours. Jackhamers each put down 80 feet in the same period.

Blasted rock was loaded to Euclids and hauled to the edge of dumped fills. The excavation was carried on through most of the winter and spring months, with the exception of a short break in February, working two 8-hour shifts. By July 1 most of the grading on the Big Horn Construction Co. leg had been finished, and that section of road was ready for base course.

The west part, which is locally known as the "Trailside gravel job", was graded before the war. By a coincidence, the Kiewit organization also did that work. A temporary wearing surface had also been made prior to the letting of the recent Kiewit contract. The principal items of this west portion were a continuation of the crushed base-course material on up the mountain, the lamination and processing of the crushed rock with water, and finally the road-mixed paving with asphaltic armor coat.

Crushing Base Rock

Explorations by the State Highway Department indicated that the only local source of rock for the base course was a pocket of conglomerate situated near Trailside, about midway in the job. The deposit was rich in fines, but it also had large boulders. If these were crushed, the required gradation of rock particles would be close, and the desired interlocking effect of crushed-rock particles would then be obtained. If this was not done, in all likelihood the rock might be too "dirty" in fines for the specifications.

The Kiewit organization moved in a 125-ton per hour Cedarapids Model E-5001 portable crusher, powered by a Caterpillar D17000 V-type diesel engine. This machine was set up on a semi-permanent basis to crush about 30,000 tons of base course and chips. Realizing that the Cedarapids plant would handle the large boulders much more efficiently if it was assisted by a primary bull-crusher, the contractor brought in a Cedarapids portable 25 x 41-inch jaw crusher, with Caterpillar D13000 diesel power, and set it up ahead of the main plant. A 30-inch conveyor belt dumped broken boulders from this big jaw crusher into the main plant.

A receiving hopper 10 x 12 feet, with slotted rail openings 24 inches across, was built of timber and set up just ahead of the first bull-crusher. Material from the pit was fed into this hopper by two Caterpillar-D8-mounted bulldozers. After it passed through the first crusher and through the jaws and

(*Continued on next page*)

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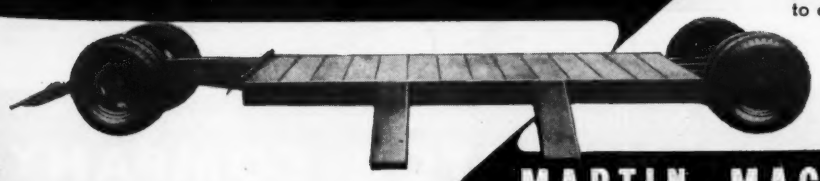

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CONTRACTORS AND ENGINEERS MONTHLY
470 Fourth Avenue
New York 16, N.Y.

New Road Blasted

(*Continued from preceding page*)

roll crushers in the main plant, it was screened for size and dumped by 30-inch conveyor to a 25-ton surge bin. A fleet of eighteen company-owned International trucks and five rented machines carried crushed rock away from this bin and dumped it on the road.

A rather amusing and effective way of procuring a bulldozer was developed here, but think twice before you try this. One of the D8's in the pit had seen years and years of service. You could scarcely tell where Caterpillar left off and homemade patching began. The old rig was not as desirable a piece of equipment as a newer machine, and it kept dropping pieces of metal: a track plate here, a piece of bulldozer framework there. This metal passed through the primary crusher, and a laborer, who had been stationed with practical foresight on the conveyor belt leading up to the main plant, picked the pieces of metal out and threw them aside.

Just who gathered them all up and brought them into the field trailer office must not be told here. At any rate, the gathering of all this scarred and chewed-up metal junk was timed to coincide with a visit from one of the top company equipment officials. His eye immediately caught sight of the twisted and torn plates, and his mind was quick to suspect abuse of equipment.

"What's that stuff from?" he asked.

"It's off that bulldozer out in the gravel pit."

"You mean that steel's dropping off the tractor in the gravel?"

"That's right."

"Good God, what happens when it gets in the crusher?"

"We are hiring an extra man to see that it doesn't," the field man said. "But it's risky business. I hate to think of what will happen to the roll crushers if a chunk of metal gets in there!"

Two days after that conversation, a trailer from the Sheridan shop pulled in to the job with a rebuilt D8.

"I got orders to leave this here and pick up the old one in the gravel pit for an overhaul," the driver explained.

Crushing work was carried on through two 8-hour shifts, starting at 6 a. m. and ending at 11:30 p. m. A 5-kw generator with International power was used to light up the place at night. Production at the crusher had been estimated at 3,000 tons for a 16-hour run, but the use of 30-inch rather than 36-inch conveyor belts made 2,700 tons a day a fair average. Material for base course was crushed first; the manufacture of about 1,260 tons of select chips for surfacing was held up until the last.

Base-Course Processing

The design requirements on base-course material differed from one end of the first contract through the Kiewit job at the west. On the Big Horn Construction Co. section, the plans called for 5 inches of material to be placed and processed in two 2½-inch lifts. On the Kiewit section farther up the mountain, 4 inches of material were required, with 8 inches on one 1,400-foot section. This material was designed to go on in 2-inch lifts.

In any case, this waterbound base course was placed by straight road-mixing with four Caterpillar No. 12 motor graders. Tests indicated that the base-course material would weigh 128 pounds per cubic foot, dry and compacted. Watering during the processing operation required 20 gallons per ton of material, and the production factor on pneumatic-tire rollers turned out to be approximately 120 tons per roller hour.

Two International K8 dump trucks, capable of hauling 15 tons of crushed rock, were used with sixteen International K7's. The smaller trucks hauled 7 tons. All of these trucks were company-owned and relatively new. Five small dump trucks were rented to round out a truck fleet which would haul the crusher output a maximum distance of 4 miles. As each truck left the crusher, it passed across a 20-ton Fairbanks beam scale. The driver was handed a weight ticket. The crushed rock was then dumped on the road according to volume, figuring the material at the base factor of 128 pounds to the cubic foot.

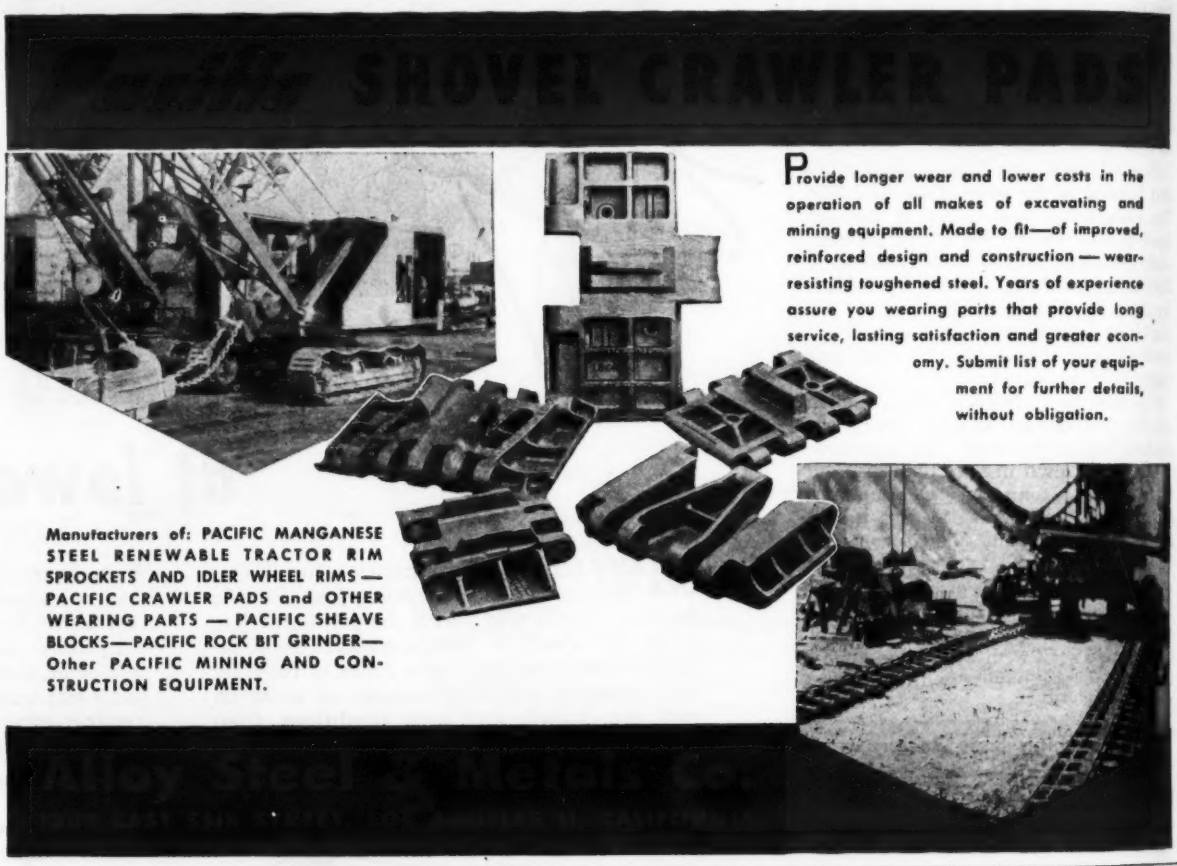
Photo courtesy of A. G. Ruppert

Rolling of the crushed-rock base course was done by this International-towed pneumatic-tire roller on the Big Horn Mountains highway job.

Once a windrow had been laid down, road-mixing with water was started. Four Caterpillar No. 12 motor graders cut material out of the pile and spread it. Two 2,500-gallon tank trucks hauled water from Clear Creek, a rushing mountain stream which tumbled down a canyon near the job, and sprinkled the gravel. A great deal of unseasonal rain and damp weather was often put to advantage in laminating the crushed rock.

The windrow was cut out and impregnated with water in this manner until it all had been processed. Then the motor graders thoroughly bladed and mixed the base, exactly as they would if it were being road-mixed with asphalt. When it was uniform as to

(*Concluded on next page*)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New Road Blasted

(Continued from preceding page)

water content, it was spread and shaped to a crowned elevation 3¾ inches higher in the center than at the sides.

A Farmall and another International rubber-tired tractor were then used, each machine towing a pneumatic-tire McCoy roller. The road base was compacted by these machines until it no longer would show a surface mark behind the wheels. Then a Buffalo-Springfield 12-ton double-axle steel roller lumbered in to squeeze the rock base down to its last iota of density.

Prime Coat and Surfacing

When the hard-packed base dried on the surface so oil would stick, it was primed with 0.4 gallon of MC-O asphalt, applied by an Etnyre pressure distributor. The asphalt coat was extended over the shoulders, making this oil 30 feet wide. The road was primed beyond the riding surface to stabilize the shoulders to some extent, and as a dust and erosion preventive.

Special crushed rock, ¾-inch maximum size, was then hauled in and laid down by the trucks. It was mixed and aerated by the motor graders until it was uniformly dry. A Cedarapids traveling asphalt plant was used to mix about 5 per cent by weight of MC-3 asphalt into this windrow. The motor graders then bladed and aerated the material, and shaped it for compaction. No pneumatic rollers were used on the armor coat. Compaction was obtained by using the massive new Buffalo-Springfield roller.

The surface of this armor was then sealed by an application of RC-4 asphalt, applied ⅓ gallon per square yard by one of two Etnyre pressure distributors. Select chips were then spread at the rate of 20 pounds per square yard, and rolled in tight with the Buffalo-Springfield roller.

There has been quite a bit of pro-and-con discussion throughout the west on this matter of surface chips. Some states want flat chips; others want rounded particles. Some want fines; others demand coarse material. Wyoming is one of the states that has received excellent service from a rock of coarse to medium size. The wearing qualities of chips crushed from igneous rock, found throughout the state, have been proved over and over again. The sieve specifications for the two jobs here were set as follows:

Sieve Size (Square Opening)	Per Cent Passing
½-inch	100
⅜-inch	95-100
No. 4	0-20
No. 10	0-5

This material will give the safe, non-skid, but smooth riding surface modern motorists demand on first-class highways.

When this spectacular job was visited, it was expected that it might drive to a finish by October 1, 1946. While the weather was not bad in Buffalo, dull dark clouds hovered up around the Big Horns.

Long before you climbed to the west end of the job, fair weather turned to mist, and mist changed to that early autumn storminess which calls for wool shirts and heavy boots. Deer mingled with white-faced Herefords on pasture-land in the mountains. Prairie chickens and sage hens huddled in small coveys under low-growing cover, trying to escape the sodden rain. The antelope season was about to open. In this setting, at the heart of America's big game country, they were trying to finish up a highway job, and this magnificent beckoning display of Nature was making it doubly difficult.

Photo courtesy of A. G. Ruppert

The Peter Kiewit organization used this Cedarapids traveling asphalt plant to mix the surface course of asphalt and crushed rock. Motor graders then bladed and aerated the material, and shaped it for compaction.

Personnel

The Big Horn Construction Co. grading project was handled by Ed Pearson as Superintendent. Joe Bartu and Mike Evans were Grade Bosses on opposite shifts. Johnny Frey was the Dirt Foreman, and Fred Shores supervised the concrete work on the few necessary structures. Dean F. Dennis was the contractor's Office Manager from start to finish.

General Superintendent Kermit Galbreath moved in with Chet Martin, Crusher Foreman, to lay and process the base and armor coats for both jobs. Jess Graham was the Resident Engineer for the Wyoming State Highway Department.

This project, many more than six years ahead of 1940 construction, was designed and administered by J. R. Bromley, Superintendent of the Wyoming State Highway Department.

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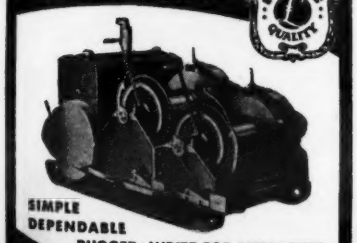

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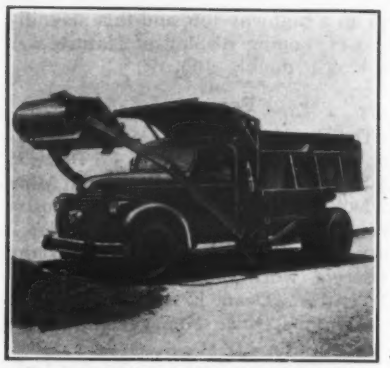


The new Butler loader for installation on dump trucks has a clamshell-type shovel. It is available in a 4 or 6-foot width, the capacity ranging from 12 to 14 cubic feet, struck measure.

New Shovel-Loader For Truck Mounting

A new loader for installation on dump trucks is now in production by the Butler Engineering & Mfg. Co., 4906 Alcoa Ave., Los Angeles 11, Calif. The shovel is of the clamshell type.

It is stated that this unit will handle any loose or semi-loose material ordinarily hauled in dump trucks. It is available in either a 4 or 6-foot width; the lifting capacity in either case is 1,400 pounds. The 4-foot shovel has a struck measure of 12 cubic feet, and the 6-foot shovel has a struck measure of 14 feet. The shovel arms and clamshell-type shovel are operated hydraulically by a Vickers pump and valve.

The truck chassis, engine, and power-transmission system are protected against overloading by a relief valve which prevents lifting more than the specified capacity. Safety switches are provided for positive stopping of the motor and all working parts when the cab door is opened.

The Butler truck-loader scoop is equipped with a removable cutting edge. Its cutting action is similar to a scraper, said to permit land leveling and other soil operations. In addition, the scoop can be tilted upwards through a 10-degree angle from its level position to give a reaching or gathering action to the upper jaw.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 26.

Heavy-Duty Trailers Have Capacities of 5 to 100 Tons

A line of trailers varying in capacity from 5 to 100 tons is described in a series of catalogs issued by the C. R. Jahn Co., 1345 W. 37th Place, Chicago 9, Ill. Standard sizes range from 10 to 60 tons, with the others available by special order. All series are available with either a level or drop-center platform.

All models have a gooseneck section which the company states is especially designed and fabricated for rated loads, with an ample factor of safety to absorb all strains and stresses. Connections between main beams and gooseneck are electric-welded and reinforced.

Models OHL-OHD, of 15 to 30-ton capacity, have an oscillating axle. It is designed to give maximum oscillation under unusual road conditions, distributing the load evenly over all tires. There are tandem axles on Models THL-THD, also of 15 to 30-ton capacity. They are attached to longitudinal rocker beams which are bronze-bushed and lubricated through pressure grease fittings. Road shocks are absorbed through heavy coil springs located at each wheel.

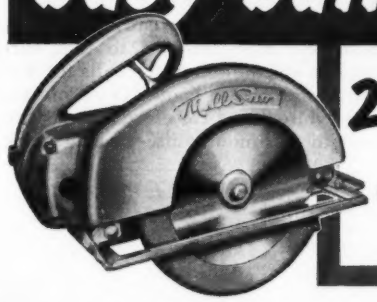
The multiple axles on Models MHL-MHD, of 40 to 60-ton capacity, consist of two rocker beams placed longitudinally under main frame members. Oscillating axles are located at each end of the rocker beams through large-diameter spindles and bearings.

The catalogs give complete specifications and dimensions for all trailers in the line, and describe, as well, features such as brakes, frame and platform construction, wheels and bearings, etc.

An additional catalog in the series describes the Model CD converter dollies for changing a semi into a standard trailer. The converter dolly is available with either single or dual axle. A rigid-mounted semi-automatic fifth wheel is mounted on the dolly frame. The operation of the fifth wheel is the same as on a regular trailer.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 87.

Good News for Busy Builders



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Pictured is a double-deck 4 x 10-foot heavy-duty Overstrom vibrating screen for sand, gravel, and similar material.

Balance Is Feature Of Vibrating Screen

A vibrating screen for which special balance is claimed is manufactured by Overstrom & Sons, 2213 W. Mission Road, Alhambra, Calif. The balance is due, the manufacturer says, to the fact that the spring centers and the vibrator unit are in alignment with the center of gravity of the screen box.

The Overstrom vibrating screens are designed for such materials as sand, gravel, crushed rock, clay, limestone, and cement. They range in size from 2 x 4 up to 5 x 15 feet, and come in single, double, and triple-deck styles. They are suitable for light, medium, and heavy-duty screening, and can be used for wet or dry material. The vibrating screen consists of a screen box supported on large spiral springs, a vibrator unit mounted on the screen box, and a foundation supporting the frame.

The vibrator means is an unbalanced shaft, mounted on two SKF self-aligning spherical roller bearings, running in a bath of oil. The shaft and bearings are entirely surrounded by a protective tubing, which in turn is clamped fast in steel castings welded to the sides of the screen box. The vibrator element is a complete unit, and is reversible end for end in its clamp members if the operator desires to drive on either side.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 27.

Wheel Tractor With Mower

A new 4-page bulletin listing features of the Model B wheel tractor with industrial mower has just been released by the Allis-Chalmers Mfg. Co., Tractor Division, Box 512, Milwaukee 1, Wis. The hydraulic cutter bar of the mower is designed to be raised 12 inches in order to permit mowing over curbs and windrows. The catalog contains many on-the-job and cutaway photographs. On its back cover are listed specifications for the 16.31-hp tractor.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 88.

Road-Tax Increases

Highway planning, together with methods of financing long-range highway plans, is expected to be a main issue in the majority of state legislatures meeting this year.

Proposals for increases in gasoline taxes are expected in at least 27 states, according to a report issued by the Information Service of the National Highway Users Conference, National Press Bldg., Washington 4, D. C. But highway-user conferences in all states will be militant against any programs advocated which would require, or request, tax increases which are unjustified, the report says.

Anti-diversion amendments are expected to be introduced in thirteen states. In three states, Indiana, Massachusetts, and Tennessee, such amendments have already been passed by one session of the legislature. They will be voted on again by the legislature convening in 1947.

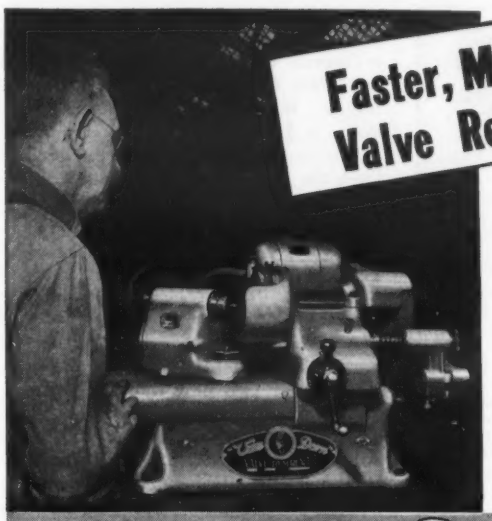
Earth-Mover Tires Stand 8 Feet High

Production of a tire nearly 8 feet high and weighing over a ton is scheduled by The Goodyear Tire & Rubber Co., Akron 16, Ohio. Curing molds are now ready for construction of these earth-mover tires.

The largest ever built by Goodyear for earth-moving equipment, the new 30.00-33 tire will have a 24-ply rating stand 95 inches high, and weigh 2,085 pounds. Its cross-sectional width will measure more than 33 inches. It will require more than 10 hours of vulcanization in the mold.

Prime qualifications of earth-mover tires, according to company officials, are their ability to carry maximum loads at maximum flotation; to resist snagging, bruising, and cutting; to provide strength for carrying heavy loads; and to supply traction for all types of surfaces.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 28.



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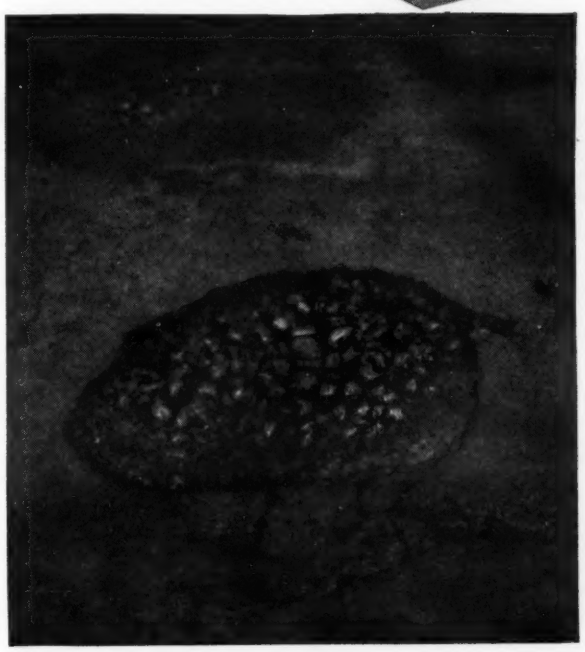

IN the spring, local eruptions caused by frost heavings often create pot holes and surface breaks that are not only a menace to the safety of motorists, but also a menace to the life of the road. If uncared for, they will wreck even a good pavement.

To the over-burdened road official, faced with important new roads which must be built or old roads which must be re-surfaced, this constitutes a tremendous problem.

But it need not be!

For Tarvia* KP road tar and Tarvia-lithic* bituminous mix are the road-builder's cure-alls. Applied cold, they may be used to patch any surface break or hole. The methods are simple and inexpensive, and the repair work properly done will add years to the useful life of your roads.

Why not check with the Tarvia field man? He will be glad to give you the benefit of experience accumulated during Barrett's more than 40 years of successful road-building and maintenance.

★ ★ ★

"The Longest Mile," a 30 minute, full-color, 16-mm. sound film on the development and importance of roads will soon be available for showing to highway officials, engineers and civic groups. Ask the Tarvia field man for it, or write the nearest Barrett Tarvia office.

Barrett Tarvia* ROAD-TAR
*Reg. U. S. Pat. Off.

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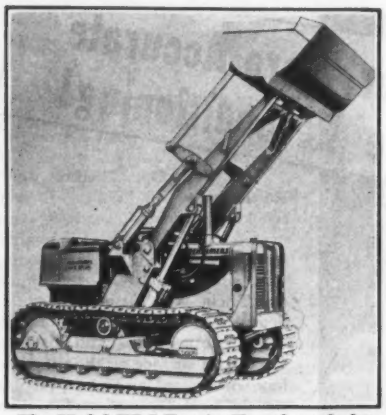


The Model TS-5 Tracto-Shovel, made by Tractomotive Corp., is designed for use on the Allis-Chalmers HD-5 tractor. It features hydraulic control of its 1-cubic-yard bucket.

Front-End Shovel Fits A-C Tractors

The Model TS-5 Tracto-Shovel, for use on the Allis-Chalmers HD-5 long-track rigid-truck-frame diesel tractor, is the first in a line of tractor equipment that will be built by the Tractomotive Corp., Findlay, Ohio.

The Tracto-Shovel has a hydraulically controlled bucket operated by double-acting lift and dumping cylinders. These cylinders are designed to provide adequate down pressure and controlled dumping and closing of the bucket. The bucket can be dumped or closed at any height, the manufacturer says, and has an automatic tilt-back to prevent spillage.

Tractor-width buckets of 1-cubic-yard capacity are standard equipment, with bulldozer blades or special buckets optional. The shovel frames are mounted directly on the tractor and contain a 25-gallon-capacity oil reservoir.

Overall length of the Tracto-Shovel is 14 feet 6 inches; width is 6 feet 3½ inches; and height with the bucket down is 5 feet 11⅝ inches.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 29.

Hydraulic Presses For Metal Working

An advance in the high-speed handling of sheet-metal fabrication is claimed for two new hydraulic presses of 25-ton and 50-ton capacities. They were recently added to the line of the John S. Barnes Corp., 127 Walnut St., Rockford, Ill. These presses have been designed for the piercing, punching, forming, and drawing of sheet-metal parts.

The company states that each press has combined the functions of several presses into one compact machine, thereby effecting the following economies: less handling, lower production and maintenance costs, fewer operators, fewer rejects, higher production rates. Each press is powered by a Barnes self-contained hydraulic unit. Dual electric controls are designed to increase safety and flexibility of operation.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 30.

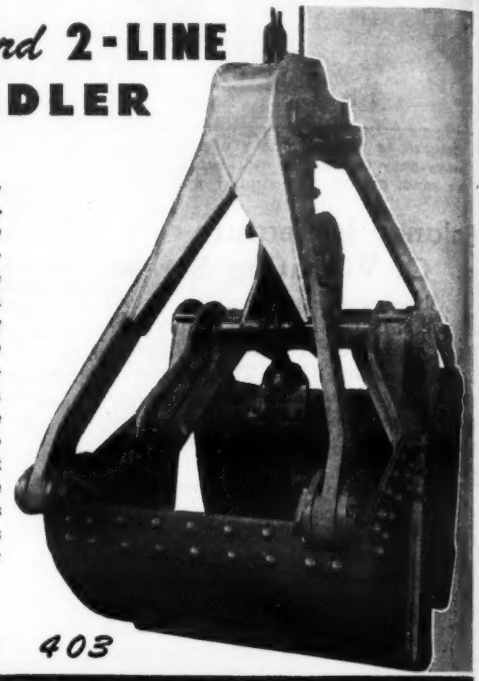
Goggles for Every Need

Protective goggles must be comfortable and convenient in order to encourage workers to use them. On this premise, the Mine Safety Appliances Co., Braddock, Thomas, and Meade Sts., Pittsburgh 8, Pa., has set up its line of protective goggles and goggle equipment. The complete line is described in an 8-page bulletin now available.

The new bulletin No. CE-29 also features the Speedframe, a goggle mounting which is said to eliminate troublesome hand adjustment; Fogpruf for quick efficient cleaning of lenses; and the goggle-cleaning cabinet which contains Fogpruf and optical wiping tissues in a convenient wall mounting.

Copies of this literature may be obtained from the company. Or use the enclosed Red Request Card. Circle No. 80.

ERIE *Standard* 2-LINE REHANDLER



THIS compact Lever Arm Rehandler Bucket of normal proportions has ample closing power to fill to capacity in compact materials, and is so designed that the reeving can be adjusted to obtain maximum speed with capacity grabs in loose materials. We have reduced the "height open dimension" thus requiring minimum headroom, enabling you to pile higher and to discharge into higher hoppers. Lighter weight alloy construction provides more pay load (scoop contents) less bucket dead weight. To see this bucket in all detail write for bulletin 403.

● *Write for Booklet 403*

ERIE BUCKETS • *A Complete Line*

Erie Steel Construction Co., 272 Geist Rd., Erie, Pa.

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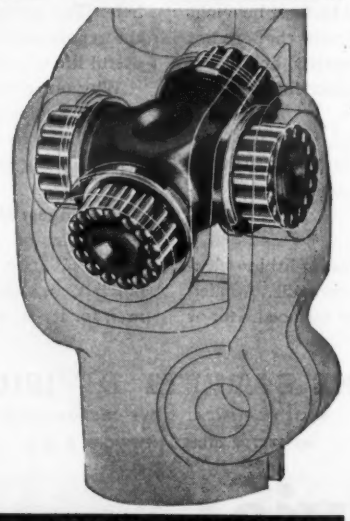
By equipping your machines with MECHANICS Roller Bearing UNIVERSAL JOINTS, you help protect their reputation for reliable, economical operation. MECHANICS' lifetime or once-a-season lubrication feature saves up to ten percent of the operator's time — formerly spent greasing plain bearing joints — cuts down grease cost, and avoids expensive break-downs caused by insufficient lubrication. Let our engineers show you how this and other MECHANICS advantages will increase the productive work accomplished by your machines.



MECHANICS UNIVERSAL JOINT DIVISION
Borg-Warner • 2026 Harrison Ave., Rockford, Ill.

HOT SPARKS *Flashing* FOR FIFTY YEARS

Back in 1897 the type of spark-ignited internal combustion engine we all take for granted today was no more than a gleam in the eye of enthusiasts. There were automobiles, of course, and tractors and portable power units of a sort, but they were clumsy and unreliable by present standards.

That was when the inventor of the first portable storage battery, Thomas Witherbee, set up shop in New York. What he made was called an "igniter" and it was, strangely enough, the lineal ancestor of today's best known *batteryless* ignition unit. In 1904 he formed the Witherbee Igniter Company and when he made a piece of equipment that developed the necessary spark *without a battery* it also was called a Witherbee Igniter. This electric igniter used an entirely different ignition method, and it could produce a strong, hot spark regardless of engine speed.

For years standard equipment on most cars and other internal combustion engines was a WICO magneto — the trade mark was taken from the initials of the original company. The business was moved to Massachusetts in 1909 and when it was reincorporated in 1920 it became the Wico Electric Company, following the trade mark.

Today WICO is the world's largest producer of magnetos exclusively, supplying many of America's largest manufacturers of farm implements, contractors' equipment, outboard motors, and large and small power units of all kinds. A well trained staff of field engineers and more than a thousand authorized service stations throughout America sell to and serve the ultimate users of these economical, reliable magnetos. Wico Electric Company, West Springfield, Massachusetts.

WICO MAGNETOS 50 YEARS OF DEPENDABLE IGNITION

Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Award Reasonable Value, Not Price, Of Unauthorized Public Contract

In negotiating a construction contract with a public official or other board, there is one simple formula designed to minimize risks of future litigation. It may be thus stated: assume that the official or board is without legal authority to enter into the contract as worded, until a check of governing charter or statutory provisions proves the contrary.

The law reports show a continuing volume of litigation growing out of cases where the existence of contracting power has been erroneously assumed. And yet the courts have repeated again, again, *and again* the substance of what the Tennessee Court of Appeals, Eastern Section, said in the recent case of Carter County v. Williams, 190 S. W. 2d 311:

"The State or one of its subdivisions is not bound by the act of its agent unless the agent was acting within the scope of his authority, and *ignorance of legal limitations upon the authority of public officials is no excuse.* Everyone dealing with them must take notice of such limitations."

The courts all seem to agree that a contract which substantially violates legal provisions prevents recovery of the *contract price* for the work, materials, or services furnished by the contractor. But it does not necessarily follow that the contractor cannot recover the *reasonable value* of what he has furnished and what has been accepted by the public authorities.

The Tennessee court seems to follow a generally recognized pattern in thus distinguishing between cases where nothing can be collected by suit and cases where reasonable value may be recovered: "Cases in this State dealing with the question may be divided into two groups: (1) cases where there is a definite and positive statutory inhibition against the claimant receiving remuneration unless the claim is supported by a contract executed in accordance with the statute, and (2) cases where there is no such prescription and the debt is based upon an irregularly executed or void contract for a benefit for which a lawful contract might have been executed if procedural requirements had been followed."

The court decided that the case before it fell within the second class, making recovery of reasonable value proper. In that case the governing statute declared that the County Superintendent of Roads should "not enter into contracts for the purchase of any equipment, materials, or supplies without first obtaining a purchase order issued by the County Chairman or County Judge, the fiscal agent of said counties, and without such purchase order the . . . Superintendent of Roads shall not have power to bind said counties or to make commitments for expenditures".

The court decided that, reasonably interpreted, the statute did not make it a vital condition that the purchase order be secured *beforehand;* and "that if the order is issued within such reasonable time as to afford the County Judge an opportunity to investigate and discharge his duty of safeguarding the rights of the County, a valid and enforceable obligation against the County comes into being when the order is signed.

"However, we cannot follow the argument that such an obligation can be created without a purchase order *ever* having been signed by the County Judge. On the contrary, we think such an order is imperatively required by the plain language that 'without such purchase order the said Superintendent of Roads shall not have power to bind said counties or make commitments for expenditures'."

The court pointed to circumstances that would justify the conclusion that the purchase order might be secured *after* the Superintendent has contracted: "We cannot believe it was intended that the Commissioner [Superintendent] would have to obtain a purchase order before he could order a bolt or a keg of nails, or that painters would have to remain idle on the job while the Commissioner hunts for the County Judge and obtains a purchase order. . . . To so construe the Act would create an expensive and irksome condition which would greatly impair the efficiency of the Highway Department. And such a construction should be avoided if possible without doing violence to the sense and purpose of the Act."

Then the court came to this question: did failure to secure a purchase order *at any time* from the County Judge, which prevented collection of the *contract price,* preclude recovery of the *reasonable value* of the equipment and materials? The court decided that such recovery was proper. On this point, the court said:

"The statute does not, in terms, prohibit recovery on a contract to be implied from the benefit received and still retained by the County, though there is no valid express contract because of failure to observe the procedural requirements of the Act. The statute says only that without the approval of the County Judge the Highway Commissioner shall not have power to bind the County. Such contracts are, of course, not enforceable while still executory [unperformed] and *claimants of this class must assume the burden of showing a benefit commensurate with the claim asserted.* We are dealing in this case, however, with claims based upon irregularly executed or void contracts which have been *fully performed in good faith,* without fraud and without actual knowledge by the claimants of the terms of a Private [special] Act. The County has received the full benefit it would have received had the County Judge formally approved the purchases, and we think the equities of the case should raise an implied contract to pay for the benefit actually received."

Intoxication as Defense To Contract Obligation

It is said that one under the influence of liquor can ordinarily be induced to sign a contract when he would not do so if sober. But it is also true that he may not be disposed to abide by his agreement when his intoxication fades away. Can he repudiate his agreement then? The answer seems to be found in an interesting decision rendered by the New Jersey Court of Chancery recently. (Seminara v. Gilman, 137 N. J. Eq. 307, 44 Atl. 2d 492.)

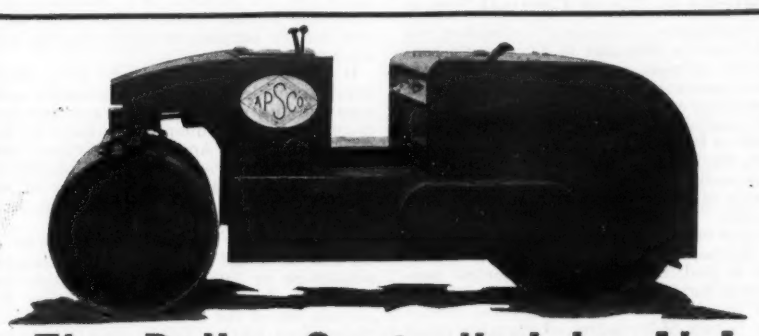
For the benefit of those who have not experimented with liquor, the court passes on information "that alcoholic intoxication may in intensity extend from a state of *conscious exhilaration* to a condition of *insensible torpidity*". Somewhere between those two extremes is to be found the point at which one becomes as legally disqualified to make a binding contract as is an insane person, the court holds.

It was decided in England 343 years ago that drunkenness was no ground for repudiating one's contract, unless one was fraudulently led into intoxication. Early decisions in this country were to the same effect. But the opinion in this case shows that a more liberal and sounder view is now generally recognized in the United States. Declared Vice Chancellor Jayne in the New Jersey case:

"Assuredly, intoxication which simply exhilarates and does not materially affect the judgement and understanding . . . does not constitute a defense to the enforcement of an executory [unperformed] contract. . . . It follows, necessarily, that to avoid the contract, the [contracting party's] intoxication must have advanced to such a degree that his mental powers . . . are so deficient that he cannot realize and appreciate the nature and consequences of his act."

In passing, it is to be remembered that the question of a contracting party's degree of intoxication on a particular day is ordinarily a difficult one to settle, especially where the evidence on the point is conflicting. The fact that a person was insane on a certain past date can usually be determined

(*Concluded on next page*)



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Air steering means effortless, finger tip control, eliminating the back breaking steering wheel. Air clutches, forward and reverse, add further to APSCO's flexibility and ease of handling.

All-around visibility and full-width rollers enable an APSCO to roll right up against a building, saving contractor's time and money on expensive hand tamping.

Ready accessibility to engine and all other key parts allow simple, economical maintenance. APSCO's sound engineering assures contractors of a sturdy roller built to stand up under years of hard use.

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No matter what the load may be—on or off the road—rain or shine—you're in the right with a rugged La Crosse Trailer.

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Write for name of your nearest dealer

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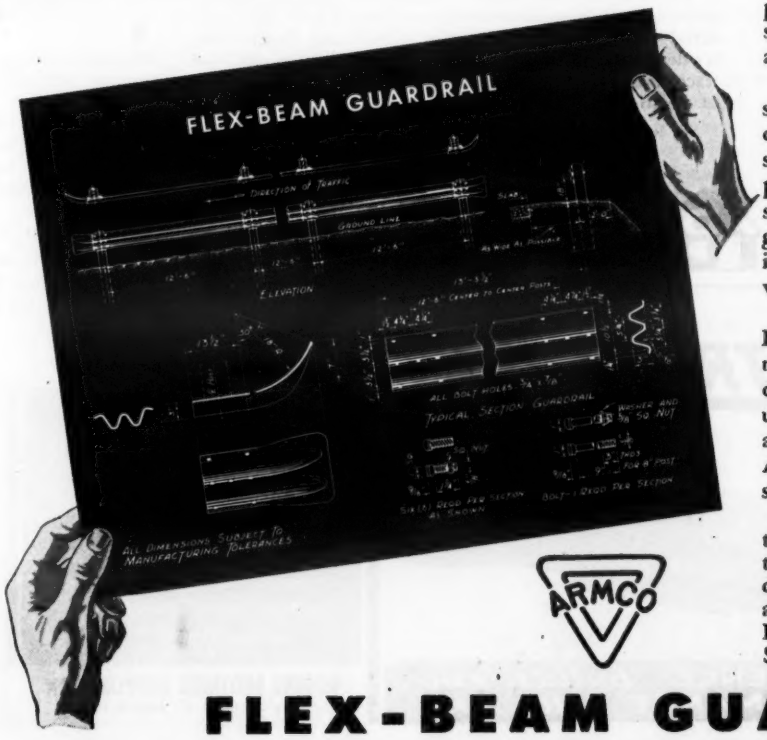

We put this safety specification on paper to show you why it works so well in practice.

Every detail of FLEX-BEAM Guardrail is designed for utmost safety. No wonder it promotes driver confidence, encourages safer driving, and guards against injury and loss of life.

This sturdy rail is made from heavy-gage steel for toughness and resiliency. Extra deep corrugations lend it unsurpassed beam strength while heat-treated bolts assure positive splices. With FLEX-BEAM, all the strength is in the rail. There is no dangerous pocketing, and the continuous sliding surface automatically deflects a striking vehicle and guides it parallel with the road.

Unskilled workmen easily install FLEX-BEAM with ordinary hand tools. No adjustments are needed. No springs, turnbuckles, deadmen or castings. Any type post may be used. No stretching is necessary on curves and the posts stay in perfect alignment. And maintenance is low because an occasional painting is usually all that's required.

A small investment will prove to you that FLEX-BEAM is the simple, practical way to lessen certain traffic hazards. Write for data and ask about FLEX-BEAM Bridge Rail as well. Armco Drainage & Metal Products, Inc., 825 Curtis Street, Middletown, Ohio. Sheffield Steel Corp., Kansas City, Mo.

ARMCO

FLEX-BEAM GUARDRAIL

Avoid Legal Pitfalls

(*Continued from preceding page*)

by the state of his mind today. But the drunk-today-but-sober-tomorrow chap furnishes a different problem. And, of course, it is not feasible to attach to every construction contract a doctor's certificate showing that the signer was sober when he entered into the agreement.

Limit District Engineer's Right to Vary Gravel Spex.

A "declaratory judgement" proceeding was lately used in Nebraska to determine a controversy between a quarry company and a water power and irrigation district. The controversy was over the powers of the district engineer to enlarge specifications of gravel to be used by the company in laying a dam filter. (Such a proceeding often offers an opportunity for solution of disputes in advance of contract performance, when time permits.)

In this case (Tobin Quarries, Inc., v. Central Nebraska Public Power & Irrigation District, 64 Fed. Supp. 200) the principal controversy turned upon this clause: "Gravel shall be clean, hard, durable pieces graded from ½ inch to 2½ inches, of a quality equal to that generally specified for first-class portland-cement concrete. Not more than 5 per cent shall pass through a No. 4 screen."

The United States District Court for the District of Nebraska decided that the engineer's powers did not extend to varying the specifications by setting up intermediate gravel grades and percentages. No such powers were implied by clauses of the contract which required performance under the direction and approval of the engineer, and provided for payment for only such work as should be accepted by him, etc.

Rejecting a contention that the contractor was bound to conform to the District's objective in constructing the dam, United States District Judge Delahant said: "The defendant [the District] has contracted for the construction of a filter layer, to be sure. And the gravel furnished . . . by the plaintiff will make one. But the contract is for a filter layer from material conforming to certain specifications prepared by the defendant as the basis of the plaintiff's bid. The familiar rule is that in those circumstances, so long as the plaintiff meets the specifications, he is held to no warranty touching their adequacy for the defendant's ultimate purpose."

But, the court said, by making available to the contractor options on gravel supplies at specified sites, the District did not thereby approve the particular gravel for use on the job, especially since the specifications stated: "The owner has made no determination as to the quantity and gradation of gravel available at the optional location."

The court concluded that if the District should require gradation of gravel not covered by the specifications, it would be bound to adjust the contractor's compensation.

Fair Labor Standards Act Applies to Waterway Work

Perhaps it is not necessary that an employee go bounding over the main in order to be classed as a "seaman", and therefore excluded from the provisions of the Federal Fair Labor Standards Act. But we do know that men engaged in dredging operations are more aptly classified as landlubbers than sailors, according to the Act.

Dredging crews engaged in deepening, widening, improving, or cleaning navigable interstate waterways, in repairing levees, etc., in aid of navigation, etc., are engaged in "commerce" within the meaning of the wage and hour provisions of the Act. That is the gist of the decision rendered by the United States District Court for the Eastern District of Missouri in the case of Walling v. Sternberg Dredging Co., 64 Fed. Supp. 758. The court cites two decisions of the United States Circuit Courts of Appeals as supporting the conclusions reached.

The Elements Interfere On a Dredging Contract

A plaintiff took a Federal contract to dredge an estimated 898,900 cubic yards scow measurement in the Cape Cod Canal. A hurricane created such current velocity in the Canal as to scour out 187,169 cubic yards covered by the contract. Plaintiff sued the Government to collect resulting loss of profits and increased dredging costs.

The United States Court of Claims dismissed the claim. (Breymann v. United States, 65 Fed. Supp. 398.) The court decided that the yardage estimate in the specifications did not amount to a warranty that quantities actually to be dredged were accurate for the purpose of computing the contractor's pay.

It decided this in the light of a clause which provided that the contractor must excavate the material at the contract unit price whether the quantity be more or less than estimated. And another clause disclaimed any guaranty by the Government that "the proportions and locations of the several materials will not vary from those indicated".

The court also decided that the effect of the hurricane did not amount to a changed subsurface or latent condition, within the meaning of the standard provision for amendment of the contract on encountering "subsurface and/or latent condition at the site materially differing from those shown on the drawings or indicated in the specifications."

Disclaim City Official Privately Urged Contract

Most, if not all, states have laws which, in varied wording, forbid public officers from being interested privately in contracts as to which they are under conflicting official duty. When it appears that there has been such a conflict between official duty and private interest, the courts will usually either penalize the offenders or invalidate the contract, or both. But a decision rendered by the California Supreme Court a few years ago illustrates one of the many situations which fall outside the Law's prohibitive provisions in this regard.

A city claimed the right to recover money paid a contracting company for street improvements. Its grounds were that a member of the city council was also attorney for the company. Recovery was denied, because it was not shown that he voted to award the contract to the company or that he had any interest in the contract when it was awarded. The court said that the case did not come within the well established rule in California that public officers must not be interested in any contract made by them in their official capacity, or by any body or board of which they are members. (104 Pac. 2d, 30.)

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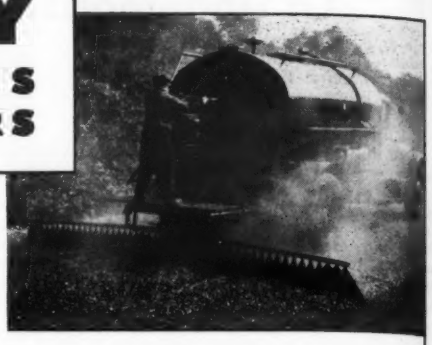
BITUMINOUS
DISTRIBUTORS



EXACT CONTROL MEANS FAST, UNIFORM SPRAYING WITHOUT WASTE

One simple, three-way valve controls the entire operation of the Kinney Distributor, from circulating or loading to spraying. This hand-operated valve is the simplest control on the market . . . speedy, leakless, efficient. Complete air-operated controls are also available. A large handwheel convenient to the operator provides wide lateral control of the spray bar, eliminating waste at road edges. The Kinney Distributor handles all grades of bitumen used in road work . . . tar, asphalt, road oil, cut back and emulsions. Its speedy Rotating Plunger Pump is accurate as a meter and applies material fast and in exact quantity specified by road engineers.

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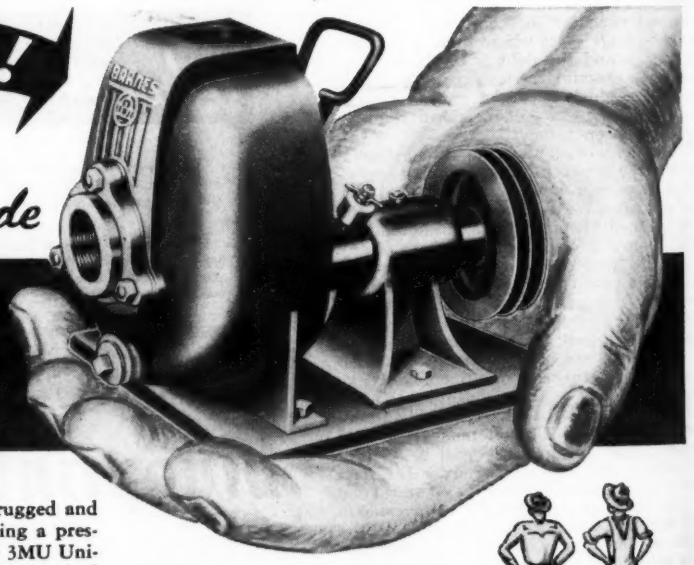
We also manufacture Vacuum Pumps, Liquid Pumps and Clutches.

This is it!
THE PUMP THAT'S
The Talk of the Trade



BARNES NEW UNIVERSAL DRIVE 1½-INCH AUTOMATIC CENTRIFUGAL PUMP . . .

It's feather-weight and midget-sized—but as rugged and as potent as the atom when it comes to delivering a pressure-packed torrent of water—is this brand new 3MU Universal Drive 1½-inch Automatic Centrifugal Pump. And it's designed to utilize any power source—belt driven from tractor, jeep or any gasoline engine or direct shaft-coupled to electric motor.

So light (35 lbs.) it can be carried with one hand, its powerful non-clogging impeller will cascade a torrent of water up to 5700 gallons an hour with pressure up to 35 pounds per square inch. The same Automatic Prime, Barnes Superseal, Direct Flow Suction, Non-Clogging Impeller and all other special features found in Barnes' famous "33,000 for 1" Pumps are in the new 3MU Automatic Centrifugal. It's the handiest implement on the place for contractors, industrial plants, municipalities, farmers and gardeners or wherever a power source is available.

You get all these in Barnes' New 3MU Automatic Centrifugal Pumps, plus the fact that *they are now ready for delivery*. If you order now, there'll be no waiting.

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Quality Pump Manufacturers for 50 Years
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small ROGERS TRAILERS too . . . embody

EXPERIENCE builds 'em
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Rogers' time proven features of fundamental design which have been tested under all kinds of severe conditions.

In any Rogers Trailer the purchaser obtains the maximum in construction features, in ease of handling, in safety and all 'round operation.

ROGERS BROTHERS CORPORATION
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For Over 70 Years
Builders of Fine
WHEEL BARROWS:
AMERICAN
STEEL SCRAPER CO.
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Airport Paving

(*Continued from page 2*)

Sieve Size	Large Rock Per Cent Passing	Small Rock Per Cent Passing
2-inch	100	....
1½-inch	90-100	....
1-inch	20-55	100
¾-inch	0-15	90-100
⅜-inch	0-5	30-55
No. 4	....	0-10
No. 8	....	0-5

Sieve Size	Sand Per Cent Passing
No. 4	95-100
No. 8	70-90
No. 16	45-65
No. 30	25-45
No. 50	5-15
No. 100	0-10

A fleet of six trucks, hauling 10 cubic yards to the load, was used to haul sand from Dubuque to the job. The contractor was fortunate in securing forty bottom-dump railroad cars which brought Penn-Dixie bulk cement to Dubuque, where it was unloaded and stored in a Blaw-Knox 300-barrel steel bin. Two 10-yard bulk-cement trucks hauled cement out to the job and stored it in two Blaw-Knox batch bins.

From six to ten trucks, each hauling three 37½-cubic-foot batches, were required to take the material out to the paver. These International trucks were furnished by Grey Construction Co. of Milwaukee.

The batch trucks had to back in under the Butler batching bin, but they were able to drive through under the Blaw-Knox bulk-cement bin. Scales on the aggregate bins were the Kron dial type; on the cement bin the beam type was used.

Mixing and Placing

The progress schedule on the pouring of runways was set up on the basis of 2,000 linear feet of 25-foot slab per 10 to 11-hour period.

C. & E. M. Photo

A welder burns holes in Heltzel steel forms to take the bolted construction-joint keyways of oak lumber. The paving-machine line-up for the Dubuque Airport runways is being assembled in the background.

The batch trucks dumped their loads directly to the skip of a new Koehring Twinbatch 34-E paver. This machine had a boom 35 feet long, which came in handy since the machine was not allowed to work from the subgrade on the slab which was being poured. The skip on the new 34-E comes up to a much sharper angle than was the case on older models, and for that reason no trouble was experienced in dislodging all the material.

Mixing water came from a creek at the south end of the main runway. It was pumped by a Barnes 4-stage and a Jaeger 3-stage centrifugal pump, using the two pumps in parallel. About 1¾ miles of 2½-inch pipe was laid, and 200 feet of hose was kept with the paver. Valves were moved ahead each evening when pouring commenced. Take-off tees were placed on 220-foot centers. Two truck-mounted water tanks were also used on a few isolated parts of the job.

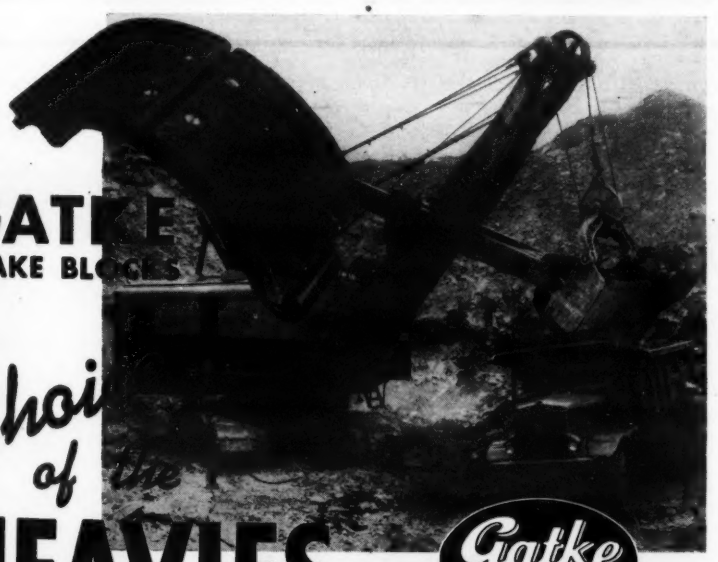
Mixing time for all concrete was 60 seconds. With the new and heavy-duty placing equipment which Woodrich & Son used, it went in the slabs without any trouble at a slump of 1¼ inches.

Two 6-cubic-yard Rex truck-mixers on Diamond T chassis were used to pour odd-shaped places in the apron, and also to pour the side of the slab on the far side of the paver. Aggregates and sand were loaded into the truck-mixers through a hopper, which was in turn fed by a Pioneer power-driven 30-inch belt conveyor.

Concrete was placed at the paver by dumping first near the form next to the 34-E machine, and working outward towards the far side. A Blaw-Knox spreader, with a rear vibrator which reached all the way across the slab, tamped and consolidated the concrete. This was a double-screed machine, not including the tamping vibrator.

Finishing machines in the order of their sequence included a Koehring Longitudinal Finisher and a Flex-Plane machine, which cut longitudinal and transverse contraction-joint slots and

(*Concluded on next page, Col. 2*)



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Onan plants have many advantages as a source of power for lighting *on the job.* Can be truck mounted, installed in or on construction machinery, or even carried by hand depending on size. Capacities range from 350 to 35,000 watts. Onan gasoline engine powered, they are easy to start. Built as a compact single unit with Onan generators direct-connected for permanent alignment.

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Plant shown is Model W35, 3000 Watt A. C.

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ELECTRIC PLANTS

The tilting deck of this Wright trailer serves as a loading ramp for equipment. Its capacity is 25 tons, and it features increased traction due to a hitch which causes part of the load to bear on the truck.

Tilt-Deck Type-Trailer Has 25-Ton Capacity

A tilt-deck trailer for loading heavy equipment without the use of skids or other auxiliary equipment is now being produced by the Wright Trailer Co., 750 New High St., Los Angeles 12, Calif. The trailer deck of 2½-inch oak is 23 feet long and 8 feet wide. It has a capacity of 25 tons.

By tilting, the deck becomes the loading ramp; thus it eliminates the danger and lost time involved in using heavy skids, the manufacturer says. Due to balanced construction, the trailer is easily coupled, driven, and loaded by one man, the firm points out. Traction is increased by means of a special hitch which causes part of the load to bear on the truck. It is stated by the company that this type of trailer has been in use for the past year with no instance of structural or parts failure or defect.

According to the company, side sway is eliminated by a rubber-cushion action of specially designed dual-axle walking action. The tractor has vacuum or air brakes with 12 x 6 shoes, Kay-Brunner axles, Budd wheels, breakaway safety valves, running lights, lashing rings, and safety chain.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 31.

Chicago Offices Combined

It has been announced by Hewitt-Robins, Inc., that the Chicago offices of its two divisions have been combined. The Robins Conveyor Division has moved from its former office to that of the Hewitt Rubber Division at 7 So. Dearborn St., Chicago 3, Ill. Enlarged quarters on the eighth floor of this building are adequate to house the offices of both divisions.

Airport Paving

(*Continued from preceding page*)

set the strip. Hand finishers followed the power finishing machines. They put on the final belt finish and touched up the joint edges with a ½-inch-radius edger.

Cem-Cure and Dryzone were used to cure the concrete, and were applied by a Richkraft spray machine.

Future of the Airport

Completion of the Dubuque Airport was regarded by the Civil Aeronautics Administration as urgent. The completed airport will be operated and maintained by the City of Dubuque, and bids fair to make it a modern "air city". Several transcontinental airlines have already indicated their desire to make Dubuque more than just an emergency stop. It might well be that a year from now the concrete runways at this modern air terminal may be getting their first heavy wheel loads. In addition, the field will be open to civilian fliers in that vicinity.

Business Forms Aid Job Record-Keeping

To make it possible for firms in the construction industry to examine cost-reducing record-keeping and similar systems used by comparable business organizations for consolidating and simplifying such office operations, Uarco, Inc., 5000 So. California Ave., Chicago 22, Ill., is making available a portfolio of sample business forms. The portfolio contains an array of business forms utilized throughout the industry and suggests innumerable time-reducing and cost-cutting methods of streamlining records and procedures.

Uarco either has on hand or will design individual forms, on request, for the keeping of records of equipment repairs, submission of bids, payroll checks, invoices, sales and job receipts, delivery receipts, service department receipts, and many others.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 32.

Protective Pigment

The successful use of a paint containing zinc-yellow pigment for protection against rust has been announced by E. I. du Pont de Nemours & Co., Wilmington 98, Del. Developed during the war, this pigment was used in paints on military equipment as an undercoat next to bare steel and aluminum. It is stated by du Pont that primers formulated with this pigment dry rapidly and provide a hard, adherent surface for the finish coat as well as protecting signs already in use.

Seven states have adopted this priming paint for use on both new and existing steel highway signs. These states, Alabama, Iowa, Kentucky, Massachusetts, Michigan, Minnesota, and Missouri, are using primers in which an average of 27 per cent of the pigment is zinc yellow.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 33.

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WRITE TODAY for literature. If you wish, mention your specific problem and get specific installation data.

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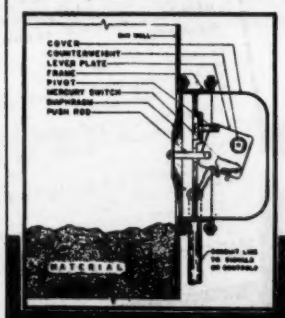

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Insures Full Supply at SMALL COST!

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More than 50 years of roller building experience, combined with the most modern manufacturing facilities, and the latest innovations in roller designs enable Buffalo-Springfield to produce the soundest and most simplified rollers ever offered to the construction industry. Long and dependable life is a feature of all of these rugged models. See your distributor for data on the new Buffalo-Springfields.

BUFFALO SPRINGFIELD
THE STANDARD OF COMPARISON
SPRINGFIELD, OHIO

The new Smith-Mobile truck-mixer comes in four sizes.

New Truck-Mixer Has Improved Design

A new-model truck-mixer embodying several improvements in design and construction has been announced by The T. L. Smith Co., 2835 No. 32nd St., Milwaukee 10, Wis.

The new Smith-Mobile units have larger drums with increased capacities. Other features are a selective dual water-injection system for mixing on the job or in transit; fully enclosed water-pump valve and piping within the motor housing to afford protection in cold weather; syphon-type water tank equipped with a single lever-operated, poppet-type, three-way valve; self-adjusting metal sealing door to compensate automatically for wear; improved three-point suspended transmission assembly with rubber mounting for bearing and rear case; Timken-bearing-equipped front-drum support; and quickly accessible clutches.

In spite of larger drums and thicker drum shell and blades that conform to the new NRMCA standards, the new model's design has made it possible to lower the weight of the unit per cubic foot of drum volume. Four sizes will be available: 2, 3, 4½, and 5½-yard truck-mixers, and 3, 4¼, 6⅛, and 7⅜-yard agitators.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 34.

Rubber Joint Sealer

An expansion and contraction joint-sealing compound of the rubber-asphalt type has been announced by the Flintkote Co., Industrial Products Division, 30 Rockefeller Plaza, New York 20, N. Y.

Said to be able to withstand a wide range of temperatures and not to deteriorate under the most severe climatic conditions, Flintseal meets Federal Specifications SS-F-336. When properly heated and poured, it is claimed that Flintseal will not flow nor creep during summer heat, nor will freezing temperatures make it crack or pull away from the joints.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 36.

Davey Dealer in East

A new dealer to handle its products in several New York counties has been announced by the Davey Compressor Co., Kent, Ohio. The new company, Broome Truck & Equipment Co., has been appointed to a full Davey dealership and will handle trailer and stationary compressors, Auto-Air and Track-Air units, Da-V-Lite lighting units, mobile machine shops, and heavy-duty power take-offs.

Territory to be covered by the Broome Co. includes the New York counties of Broome, Chenango, Delaware, Tioga, Tompkins, Chemung, Schuyler, Cortland, and Yates. The company's headquarters are at 340 E. Main St., Endwell, N. Y.

Universal Atlas News

The promotion of three staff members has been announced by Universal Atlas Cement Co., New York City. Wendell R. Doolittle, Jr., will be Assistant Sales Manager for the Chicago territory. Welby A. Hoblit will be a special representative for the Illinois-Wisconsin district, with Helge E. Jacobson as District Sales Manager.

Index to Advertisers

Aaroll Products Company 63
Allied Steel Products, Inc. 42
Allis-Chalmers Tractor Division 52
Alloy Steel & Metals Company 78
All-Purpose Spreader Co. 83
American Conveyor Company 34
American Hoist & Derrick Co. 48
American Steel Scraper Co., The 84
Anchor Coupling Co., Inc. 33
Ariens Company 9
Armco Drainage & Metals Products, Inc. 83
Austin-Western Company 42

Barber-Greene Company 11
Barco Manufacturing Company 46
Barnes Manufacturing Co. 84
Barrett Division, The 81
Beebe Brothers 59
Bernstein Brothers 65, 75
Bethlehem Steel Company 75
Bicknell Manufacturing Co. 55
Bin-Dicator Company, The 86
Bitucote Products Co. 16
Brown-Strauss Corp. 43
Buckeye Traction Ditcher Co., The 15
Bucyrus-Erie Company 61
Buffalo-Springfield Roller Co., The 86
Byers, P. L. 42

Carlyle Rubber Company, Inc. 58
Carter Co., Ralph B. 72 87
Cataphote Corporation 53
Chain Belt Company 62
Chicago Pneumatic Tool Company 68
Chrysler Corporation, Industrial Engineering Div. 41
C.I.T. Corporation 35
Cleaver-Brooks Company 74
Coffing Hoist Company 8
Complete Machinery & Equipment Co., Inc. 35
Concrete Surfacing Machinery Co. 67
Continental Decalcomania Company 66
Continental Rubber Works 69
Cummer & Son Co., The F. D. 60

Davenport Besler Corporation 62
Detroit Diesel Engine Division, General Motors Corporation 18, 19
Dewey & Almy Chemical Co. 87
Dodge, Division of Chrysler Corp. 33
Dorsey Trailers 70
Duff-Norton Manufacturing Co., The 64

Electric Tamper & Equipment Co. 76
Elliott Company, B. K. 87
Erie Steel Construction Co. 82
Euclid Road Machinery Co., The 14

Flink Company, The 60
Fontaine Truck Equipment Co., Inc. 7
Foote Co., Inc., The 21, 65
Ford Motor Company 27

Gar Wood Industries, Inc. 34, 63
Gatke Corporation 85
General Excavator Co. 79
Griffin Wellpoint Corporation 30

Haiss Manufacturing Co., Inc., George 16
Hayward Company, The 26
Heltzel Steel Form & Iron Company 50
Hendrix Manufacturing Co., Inc. 56
Hobart Brothers Company 49
Homestead Valve Mfg. Co. 21
Huber Mfg. Co., The 54
Hurstco Incorporated 40

Independent Pneumatic Tool Company 26
Industrial Equipment Company 8
International Harvester Company 30, 59
Iowa Manufacturing Company 67

Jaeger Machine Co., The 9
Jahn Company, C. R. 60
Jaques Power Saw Company 51
Johnson Company, The C. S. 22, 23
Joy Manufacturing Company 48

Keystone Asphalt Products Co. 72
Kinney Manufacturing Co. 84
Klauer Manufacturing Company 32
Koehring Company 22, 23
Kwik-Mix Company 22, 23

La Crosse Trailer Corporation 83
Lansing Company 11
LaPlant-Choate Manufacturing Co., Inc. 38, 39
Le Tourneau Inc., R. G. 88
Lewis Manufacturing Company 46
Linn Manufacturing Corp., The 16
Littleford Bros., Inc. 69

Maine Steel Incorporated 37
Mall Tool Company 80
Marion Machine Company 54
Martin Machine Company 77
Marvel Equipment Company 28
Master Vibrator Company 78
McKiernan-Terry Corp. 72
Mead Machine and Iron Works, Inc. 51
Mechanics Universal Joint Division 82
Michigan Power Shovel Company 36
Milwaukee Power Equipment Co. 71
Minneapolis-Moline Power Implement Co. 24
Monarch Road Machinery Co. 52
Murphy Diesel Company 57

Oakite Products, Inc. 56
Oliver Corporation, The 43
Onan & Sons, D. W. 85
Osgood Company, The 79
Ottawa Steel Products, Inc. 72
Owen Bucket Co., The 68

Page Engineering Company 80
Parsons Company 22, 23
Pettibone Mulliken Corporation 71
Pioneer Engineering Works, Inc. 25

R.P.B. Corp. 29
Rockford Clutch Division 64
Roebling's Sons Company, John A. 31
Roeth Vibrator Company 20
Rogers Brothers Corporation 84

Sasgen Derrick Co. 29
Schield Bantam Company 50
Seaman Motors Company 5
Servicised Products Corporation 76
Shaw Sales & Service Company 53
Shunk Manufacturing Company 36
Silver Booster Manufacturing Co. 20
Simplicity System Company, The 41
Sinclair Refining Company 10
Standard of California 47
Standard Oil Company (Indiana) 73
Sterling Machinery Corp. 79
Sterling Wheelbarrow Company 64
Stoody Company 24

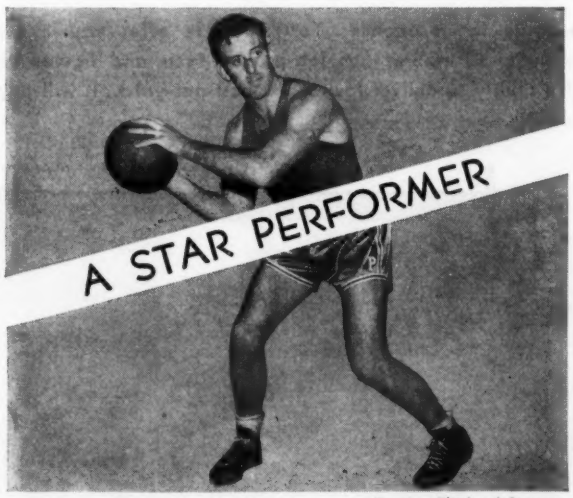
Texas Company, The 3, 12, 13
Thew Shovel Company, The 17
Tuthill Spring Company 73

Unit Crane & Shovel Corp. 40
United Laboratories, Inc. 60
United States Motors Corp. 86
United States Rubber Company 57
Universal Engineering Corp. 49

Van Dorn Electric Tool Co., The 81
Viber Company 10
Vickers, Inc. 55
Victor Equipment Company 61
Vulcan Tool Manufacturing Co. 14

Walter Motor Truck Co. 77
Warren-Knight Co. 15
Waukesha Motor Company 66
Wellman Engineering Company, The 76
White Manufacturing Company 70
Wico Electric Company 82
Witte Engine Works 80
Worthington Pump & Machinery Corp., Worthington-Ransome Construction Equipment Division 58

Yaun Dragline Buckets & Mfg. Plant 28



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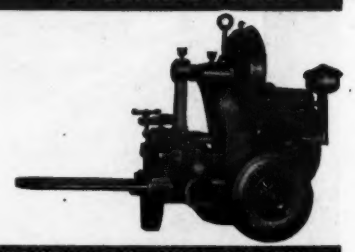

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